Alaska Forest and Resources Practices Act
Documentation of Region III Review
1999-2001

March 2001

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DNR Division of Forestry
550 W. 7th Avenue, Anchorage, AK 99501

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This package documents the review and revision process for the Forest Resources and Practices Act riparian standards review for Region III (Interior Alaska). The review occurred from March 1999 through February 2001. It covers the work of the Region III Science and Technical Committee, the Implementation Group, and the Board of Forestry. It also includes the legislation introduced in February 2001 to implement the recommendations from this process.

In addition to these materials, the Science and Technical Committee produced the *Region III Forest Resources & Practices Riparian Management Annotated Bibliography, August 2000* which is available on request from the DNR Division of Forestry.

Science & Technical Committee (S&TC) documents

Region III Forest Practices Stream Classification Commitee – Contact List

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Region III Science & Technical Committee - Stream Classification System and Recommended Buffers **July 28, 2000** (This chart incorporates consensus point C3b)		
Waterbody type	**Recommendations**	**Notes**
All types	**C21** Stream buffers should be measured from the ordinary high water mark (OHWM) regardless of the vegetative cover type within the buffer zone. **C28** Different reaches of streams and the banks of the same reach can be classified differently. Where multiple channels occur, each channel is classified separately. **C31** Windthrow is not a major risk in most areas of Region III. In sites where high winds are common, buffers should be designed to be windfirm by considering wind direction, orientation of harvest units, canopy size, and tree species.	**C7** The need for buffers should be reevaluated if there is a significant increase in the level of harvesting along glacial rivers.

<table>
<tr><th>Waterbody type</th><th>Recommendations</th><th>Notes</th></tr>
<tr>
<td>Type A –
Backwater sloughs with anadromous or high value resident fish populations</td>
<td>C11 A minimum 66' no-cut buffer is needed to provide large woody debris and shade on Type A waters. To avoid reducing natural shading, the width should be increased as needed based on stand height, vegetative composition, and susceptibility to windthrow. Natural shade conditions vary based on tree height, tree species and understory vegetation, and bank geometry.</td>
<td>C5 A "backwater slough" is a waterbody that has sluggish flow, is warm in summer, and typically is only connected to the main stem or a side channel at one end. A backwater slough carries river current only under high water conditions, and may have only a seasonal connection to the main stem or side channel.

C11am2 To maintain the supply of LWD, a buffer of approximately 50-60' from the OHWM is needed based on average dominant tree heights of 70-80', and a typical height to a 4" top in these trees of about 50'. Based on studies in other areas, most LWD comes from within two-thirds of average tree height.

C22 Shading is a function of tree height, sun angle, and latitude. At latitude 65° N (the latitude of Fairbanks), the following shade distances occur:

<table>
<tr><th></th><th>Shading distance by date</th><th></th></tr>
<tr><th>Average
Tree height</th><th>June 21
(max. sun angle)</th><th>July 18
(warmest stream temp. in Interior</th></tr>
<tr><td>70 feet</td><td>62 feet</td><td>67 feet</td></tr>
<tr><td>80 feet</td><td>72 feet</td><td>77 feet.</td></tr>
</table>
</td>
</tr>
</table>

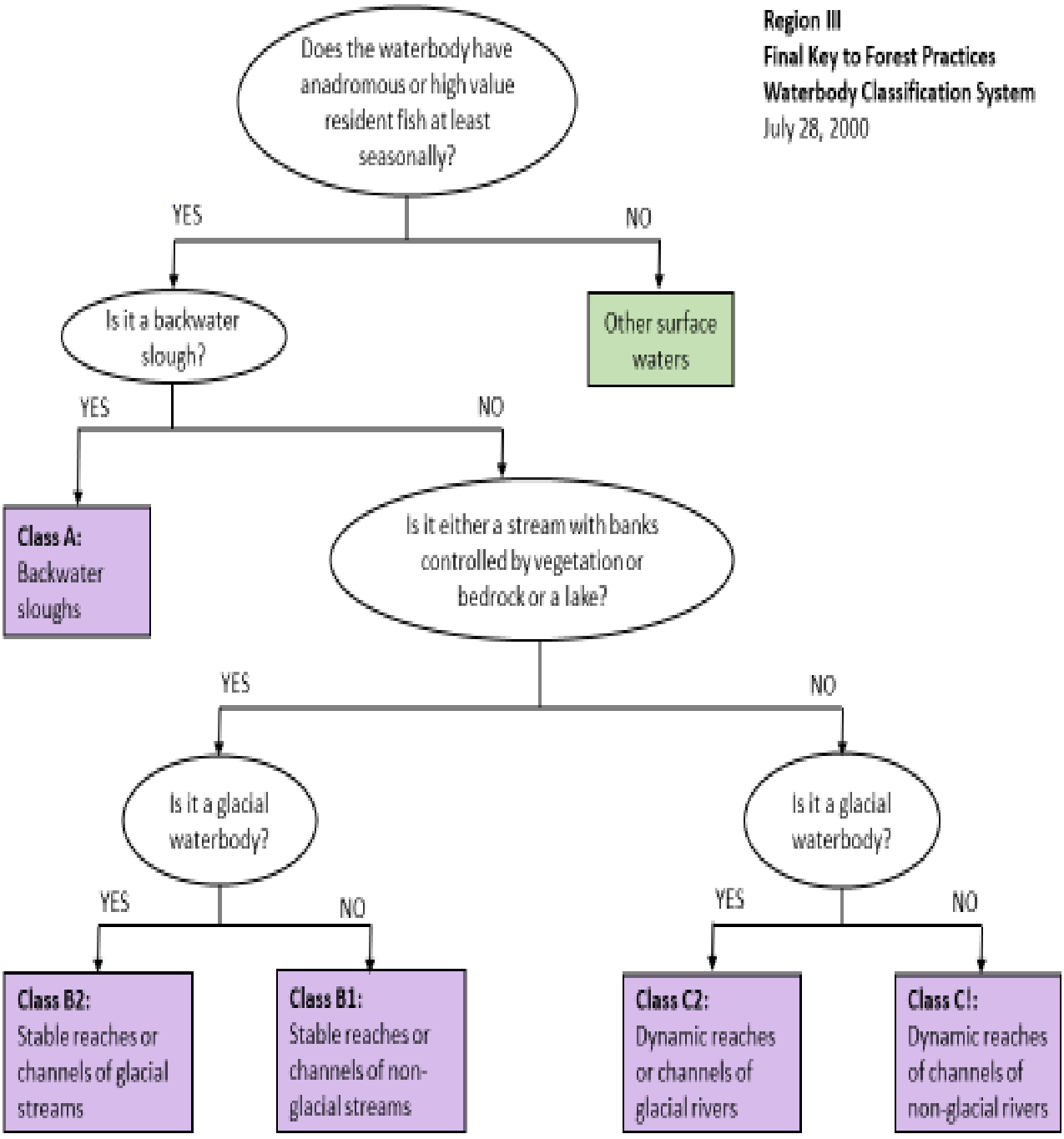
Subtype B1 – Stables reaches or channels and lakes in non-glacial waters with anadromous or high value resident fish populations.	**C12am** No-cut buffers are needed for Subtype B1 waters. Buffer design for these classes should incorporate concerns for large woody debris, shade, bank stability, channel morphology, and prevention of sedimentation. Shade provides cover for small fish along banks and controls temperature increases in sloughs and other waters with slow flows. **C14am** No-cut buffers on Subtype B1 waters should be a minimum of 66'. The width may be increased when needed to control sedimentation from steep slopes adjacent to the water bodies. More information is needed to determine the appropriate buffer width to prevent sedimentation or introduction of organic leachate from *steep* slopes adjacent to these water bodies. Few riparian areas along these water bodies have steep slopes.	See **C11am2** above for rationale on width needed to provide LWD. See **C22** above for rational on width needed to provide shade.
Subtype B2 – Stable reaches or channels and lakes in glacial waters with anadromous or high value resident fish populations	**C32** No-cut buffers on Subtype B2 waters should be a minimum of 50-60' to provide LWD to these reaches.	See **C11am2** above for rationale on width needed to provide LWD.

Subtype C1 -- Dynamic reaches or channels in non-glacial waters with anadromous or high value resident fish populations	**C33** No-cut buffers on Subtype C1 waters should be a minimum of 50-60' to provide LWD to these reaches. Because of high fish habitat values, some Subtype C1 waters may merit consideration for wider buffers on a site by site basis, but the S/TC does not have a basis for generic recommendations for wider buffers.	**C29a** Dynamic reaches are defined as reaches or channels with active channel movement, shifting bed load, and eroding banks, usually associated with the floodplains of large river systems. See **C11am2** above for rationale on width needed to provide LWD.

Subtype C2 – Dynamic reaches or channels in glacial waters with anadromous or high value resident fish populations	**No consensus reached –** see **C34** and discussion in minutes for meeting #12, July 28, 2000.	See **C29a** above for definition of dynamic reaches **C8am** Additional research is needed on the role of LWD in Subtype C2 waters. **C29** With respect to dynamic reaches of large rivers, the committee agreed to the following points. • Large woody debris affects the morphology of dynamic river systems (e.g., development of bars, side channels, sloughs). • We do not know how much LWD input must be maintained to sustain the channel morphology function in these systems. • The Tanana River Dynamics project underway will help provide information for one river system -- the Tanana River, where nearly all commercial harvesting in Region III is currently taking place. For the Tanana River, this study will provide data on the average annual input of LWD, the amount that comes from each forest type, and the proportion of important forest types that are open to harvesting. **C34** For C2 waters, the S/TC agreed to the following points. 1. There is no consensus on the need for a buffer to supply adequate LWD to maintain fish habitat in dynamic reaches or channels of glacial waters. 2. LWD typically has short residence time at the source site – it is usually transported downriver unless lodged in an island or river bar. 3. More information of the input of LWD will be available from the Tanana River Dynamics study that is currently in progress (12-18 months). 4. Most LWD in these reaches and channels is recruited by erosion rather than windthrow. 5. The main role of LWD in these reaches and channels is in channel morphology, particularly the formation of river bars and islands. S/TC members described the following main viewpoints <u>Position A</u>: Forest operators won't significantly impact the supply of LWD in these river systems based on the amount of LWD input from natural erosion and the limited availability of areas for harvesting. Therefore, no buffer should be required. Buffers may be used if needed to provide other functions on a site-by-site basis. <u>Position B</u>: Information on the necessary level of LWD is insufficient to determine whether harvesting adversely impacts LWD supply. Because of this uncertainty, and because of the importance of LWD

Subtype C2, cont.		to fish habitat ... Position B1... a buffer should be required of at least 50-60' based on the width needed for local recruitment of LWD. Position B2... a threshhold should be set for the proportion of streamside forest vegetation that must be maintained at all times. The extent of forest cover should be monitored, and the threshhold amended as appropriate as new information becomes available.
Other surface waters with no anadromous or high value resident fish populations	Best management practices in 11 AAC 95 apply to other surface waters.	

Science & Technical Committee
Region III
Final Key to Forest Practices
Waterbody Classification System
July 28, 2000



Note: Region III Science/Technical Committee **Importance Matrix of Water Body Types and FRPA Habitat Components (C3am)** is attached as a separate link

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #1; March 30, 1999
DNR Large Conference Room, Fairbanks, AK

Attendance
Amy Ash, DEC
Steve Clautice, DNR DOF
Mike Doxey, ADF&G SF
Jim Durst, ADF&G H&R, co-chair
Torre Jorgenson, ABR
John Fox, UAF
Chris Maisch, TCC, timber industry representative
Mark Oswood, UAF
Bob Ott, TCC, timber industry representative
Deanne Pinney, DNR DGGS
Jim Reynolds, UAF
Dave Valentine, UAF
Marty Welbourn, DNR, co-chair

Visitors
Bob Carlson, UAF
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council
Note: Points of consensus are shown with a **C**. Work commitments/assignments are shown in a box with the responsible person's name in **bold**. Handouts referenced in the minutes are available from either co-chair; some are quite lengthy.

BACKGROUND

Region III Stream Classification Committee members and visitors each gave a brief synopsis of their relevant background and experiences for the benefit of those they have not worked with previously.

Marty provided the committee with an historical setting and the charge from the Board of Forestry (BOF). At its fall 1997 meeting, the BOF discussed riparian area management standards for Region III (Interior Spruce/Hardwood Region, North and West of the Alaska Range). Until now, the majority of work by the state resource agencies on riparian standards had focused on Region I (Coastal Sitka Spruce/Hemlock Region), as evidenced by the Science/Technical Committee that met during 1996 and 1997, and lead to the BOF recommending revisions to the Forest Resources and Practices Act (FRPA) and implementing Regulations.

In the summer of 1998, workshops were held in regions II and III in response to a request from the BOF that research needs related to riparian management be reviewed. Region III was seen by the BOF as the best opportunity to review riparian management. Marty referred the committee to the summary of the Region III Riparian Management Research Workshop that was mailed to the committee members previously.

WATER BODY CLASSIFICATION SYSTEMS

The committee's goal is to work on developing a water body classification scheme for Region III. If possible, the goal is to have at least a preliminary classification completed by the July BOF meeting. The target groups for such a scheme are the BOF for all land ownerships, and the Tanana Valley State Forest Citizens Advisory Committee for state lands in the Tanana Valley.

Once a classification system is developed, the next steps will be to map the streams in the Tanana Basin by class, review the existing riparian standards for forest practices, and develop recommendations for statutory and regulatory changes that may be needed to revise the riparian standards.

Marty reviewed the basic structure of the FRPA and implementing Regulations, with particular emphasis on riparian management intent and standards. The FRPA focuses on fish habitat and water quality on nonfederal lands. Slope stability standards currently apply to state and other public lands in Region III, but not private lands. High value resident fish are emphasized more in Region III than in Region I.

Marty led a discussion of the basic tenets of a stream classification system, particularly the linkage between fish presence or absence and physical habitat characteristics. It was agreed that for a system to be useful, it must be

- simple enough for consistent field use,
- able to address dynamic water body systems,
- able to classify different stream reaches (and banks?) differently,
- able to recognize seasonal changes in fish use and physical characteristics, and
- take into account the presence of absence of fish.

Ideally, the system should also be consistent with other studies and stream classification systems already in use to facilitate use of data from other research.

Deanne reminded the committee to include the roles of permafrost in the classification analysis.

Jim D. presented an overview of some other stream classification systems in use in Alaska, including the Forest Service's process group classification for Southeast, Dave Rosgen's geomorphic stream classification, and habitat types used by ADF&G biologists during recent fish habitat research in the Tanana Basin. He also discussed the four guiding principals from the Green Book, and noted the BOF's recent affirmations of those principals.

Marty will see that the committee members all have a copy of Green Books I and II by next meeting.

REGION III STREAM CLASSIFICATION

C1 The committee agreed that the Region III stream classification system for forest practices should take into account the ten habitat components from AS 41.17.115; be easy to use consistently in the field; take into account the presence or absence of fish; include the roles of permafrost and soil composition; accommodate variations between reaches and segments, and seasonal changes; be appropriate in a disturbance-based ecosystem; and allow transfer of information from other classification systems (e.g., DNR terranes, Milner et al. 1997, Paustian 1992, Ott et al. 1998) if possible.

The committee used the four stream classes identified during the Region III riparian workshop as a starting point, and quickly added a fifth class: Glacial waters, Sloughs and oxbows that are partially connected to glacial waters, Non-glacial groundwater streams (e.g., Richardson Clearwater River), Non-glacial runoff streams (e.g., Chena River), and Streams connecting lowland lake to river systems (e.g., outlets from lakes in Minto Flats).

Jim D. asked for clarification of the area of consideration for the classification system being developed by the committee. Marty noted that the state is the dominant owner of current and near-future timber sales in the Tanana Basin as well as the mid- and upper-Kuskokwim Basin, and that these were the major timber areas in Region III. Marty also noted that the Tanana Basin Area Plan, the Tanana Valley State Forest Management Plan, and the FRPA bore on timber harvest activity decisions within those areas.

The committee identified future background information needs, including fish distribution by species and life stage, which habitat properties are important to fish, and whether or not digital elevation data are available.

MATRIX OF WATER BODY TYPES, FISH HABITAT COMPONENTS, AND POTENTIAL FOR EFFECTS

As a starting point for the Region III classification system, the committee began developing a matrix of importance ratings for each of the ten habitat components in a variety of water body types (last page of minutes). Ratings were based on best professional judgement, assumed anadromous or high value resident fish were present, and included both importance of the component to fish habitat in each water body type and likelihood of forest management activities to affect that component at the scale of a stream reach. A number of observation s were made during development of the matrix:

- Carbon inputs to streams in Region III are 20-25% of what one would find in more temperate systems in Montana, Washington, etc. Increased carbon inputs would increase productivity except in small streams under ice cover where deoxygenation could occur.
- Nutrient cycling is primarily concerned with inorganic carbon, nitrogen, and phosphorus.

- Food sources can be thought of as organic carbon. Leaf litter input is a significant component of this.
- Water quality is primarily liquidity and sufficiency during the winter months, along with dissolved oxygen and reduction-oxidation (redox) potential. Temperature concerns are primarily during the winter months. During the warmer months, pH, turbidity, and organic materials become larger factors.
- Ice bridge issues may be best addressed by BMPs or site specific evaluations rather than stream classification or riparian standards.
- Water temperature is important to productivity throughout Interior water bodies.

Mark commented that all the anadromous and high value resident fish eat invertebrates, or eat fish that eat invertebrates. All the LWD that he has examined from the Tanana River has had very high invertebrate densities using it as a substrate. He has also found that spawning gravels are "invertebrate-growing" gravels, and that most finer-grained sediments seem to have insignificant invertebrate production in streams where he has looked. Mark also noted that his experience was that "springs" and "groundwater" are the major adjectives of the noun "rivers" in Alaska. He also clarified that, in aquatic systems, "nutrients" refer to inorganic nitrogen and phosphorus that are used by flora whereas "food" refers to organic carbon sources consumed by heterotrophic organisms.

Mike asked what effect timber harvest might have on LWD recruitment rates. Bob O. replied that at current harvest rates, the amount of LWD being recruited to the Tanana River by bank erosion was much greater than any reduction that could be attributed to timber harvest. He also suggested that non-timber lands within and adjacent to the floodplain might act as refugia for LWD sources.

Jim D. suggested that two tests the committee should use when rating timber harvest effects are "so what?" (biological consequences) and what the sensitivity of the habitat component may be to management activities.

Torre asked what constituted a glacial stream. The committee agreed that this can be a difficult definition, with different people identifying different factors including braiding, silt loading, and water source(s).

The committee noted that most of the stream reaches that had been discussed could be classified in several different ways and have different limiting factors in different seasons.

Torre stated that he believed channel morphology was too broad a characteristic to be useful in the rating matrix, and the committee agreed that channel geometry (entrenchment, depth ratio) was more useful. This was reflected in the matrix.

Jim D. asked what stream systems besides the Tanana and Kuskokwim had large stands of commercial timber. Steve will brief the committee in more detail on commercial timber stands at the next meeting.

The committee noted that although our assumption was that forests are adjacent to all the water bodies we were discussing, actual distribution of trees and timber is often patchy. Areas of nontimber trees, and grassy flats, can also occur adjacent to these water bodies.

Mark stated that, based on extensive thermocouple transects he has been a part of, streams in the region can have tremendous year-to-year variability in thermal regime, and that adjacent patches of stream bed can have substantially different thermal regimes. He also has observed that the fall precipitation regime is extremely important for thermal profiles. Mark commented that increased sunlight would benefit productivity for fish in Interior waters except in shallow oxbows.

The committee agreed that permafrost concerns may be much more closely tied to access issues within and outside the riparian areas than to harvest effects. Permafrost is not a "habitat component" in the sense of AS 41.17.115, but may affect water body characteristics.

The **committee** agreed that they will need to revisit this issue at a future meeting.

Mark suggested that a set of expert systems models (such as the Starfield approach) may be the best way to answer the need for a stream classification system. Chris agreed, noting that the Kenai Peninsula SBExpert model for spruce bark beetles worked this way and appeared to be a good choice.

Bob O. asked how a stream classification system would deal with highly productive lake systems such as George and Healy. Torre noted that the Interior as a whole has a huge number of highly productive lakes. The committee added lakes with anadromous or high value resident fish to the matrix of water body types and habitat components.

319 GRANT PROPOSALS FOR FY 2000

Marty briefed the committee on the proposals for 319 Grant funding in FY 2000 that were most relevant to the work of the committee: Tanana Fish Habitat (ADF&G), Winter Access (Ice Bridges) (DNR), Tanana River Dynamics (DNR/TCC), Stream Class Mapping (DNR), Cover Type Mapping in Tanana Riparian Areas (DNR) and Aerial Survey of Delta-Little Delta Rivers Area of Tanana (ABFC). Marc Lee (Acting Fairbanks Area Forester) joined the group to explain the Tanana River Dynamics project. Marty asked the committee to provide their perspective on priority projects, but no consensus was reached. The ice bridge project was pointed out as a good type of project because is seemed discrete, quantifiable, and addressed a pressing question.

SUMMARY

At this meeting, the committee:

- Identified a list of points to consider when developing the Region III Stream Classification System.
- Started with four water body categories, and expanded that to seven.

- Began assessment of two issues: importance of habitat components to fish habitat by water body type, and likelihood of sensitivity to forest management activities.

NEXT MEETING

At the next meeting, set for **Tuesday April 13, 1999, at the same location**, the committee:

- Will likely finish the initial assessment matrix.
- Will examine what stream types are most likely to have timber harvest occur beside them.
- Will receive an update on the Alaska Boreal Forest Council's aerial photography project.
- Will receive an update on the 319 Grant proposals.

MEETING #1 HANDOUTS

- Forest Resources and Practices Act (FRPA) riparian management language, reformatted from AS 41.17.115.
- Table 1. Existing riparian management standards by region and land owner, March 26, 1999.

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #2; April 13, 1999
DNR Large Conference Room, Fairbanks, AK

Attendance
Steve Clautice, DNR DOF
Mike Doxey, ADF&G SF
Jim Durst, ADF&G H&R, co-chair
Torre Jorgenson, ABR
John Fox, UAF
Mark Oswood, UAF
Bob Ott, TCC
Deanne Pinney, DNR DGGS
Dave Valentine, UAF
Marty Welbourn, DNR, co-chair

Visitors
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council
Cal Skaugstad, ADF&G SF
Tom George, Terra-Terpret

Note: Points of consensus are shown with a **C**. Work commitments/assignments are shown in a box with the responsible person's name in **bold**. Handouts referenced in the minutes are available from either co-chair; some are quite lengthy.

Marty distributed copies of a DNR DGGS report by Maurer (1999), describing water quality and benthic invertebrates for the Richardson Clearwater River. The project was done as a baseline study in anticipation of proposed agricultural land disposal south of the river.

MINUTES FROM MEETING #1

The committee reviewed, amended, and approved the minutes from the March 30, 1999, meeting. Members have until April 16 to provide any additional minor edits to Jim.

Mark said that the Cowardin and Rosgen stream classification systems are not stream reach based but rather based on geomorphic processes. Therefore, he does not believe that they are suitable for the type of classification scheme the committee is developing. Stream reaches tend to be on the order of tens of meters to hundreds of meters in length, with stream segments being the next larger stream portion (see Frissell et al. 1986). Mark believes we are developing a classification system that operates at the segment level.

John noted that the committee is really trying to classify streams at the segment or higher levels although we are concerned about fish habitat at the reach or lower levels.

The committee discussed stream systems hierarchies, from basin level to microhabitat, particularly as they relate to the water bodies for which we are trying to develop a classification scheme and management prescriptions.

Mark stated that most of what we identified in the habitat matrix occurs at the reach level, but that we can't census a whole stream. This leads to a sampling problem, which perhaps could be addressed by dealing at the segment level.

C2 The committee agreed that the stream hierarchy of Frissell et al. 1986 was appropriate for use in the Region III stream classification process. Although effects on fish and their habitats occur primarily at the reach and lower levels, practical considerations require stream classification and management prescriptions to occur at the segment and higher levels.

Dave asked about how the Forest Practices Act determines the presence or absence of fish. Marty explained that operators do an initial determination based on whether or not a "presumed blockage" exists between the stream reach and known anadromous waters. "Presumed blockages" are defined in the regulations. However, there is also a provision for ADF&G to check the initial determinations if they have concerns or if the landowner or operator requests that they check. If anadromous fish are present, the stream is classified anadromous regardless of whether the criteria for presumed blockage are met. Conversely, if a field check identifies no fish or presence of fish, the stream is not classified anadromous. Some streams are not fish bearing even if no blockage exists. Mike also noted that the standards in Region III address waters that support "high value resident fish" as well as anadromous species.

ABFC UPWELLING PROJECT UPDATE

Richard McCaffrey, Alaska Boreal Forest Council, provided the committee with an update on the ABFC's "Mapping Evidence of Upwelling" project, aimed at identifying and mapping upwelling areas along the Tanana River between the mouths of the Delta and Little Delta rivers. Richard provided an overview of project goals, collaborators, tasks, and progress to date. The ABFC currently has funding for three cycles of aerial photo taking, photo interpretation, and partial ground-truthing, and have a proposal pending for additional 319 funding next fiscal year. The existing DNR base map will be used to display the results of the project, and the group is exploring making the data available on an internet web site.

The committee asked Richard a series of questions, including the use of potential use of infrared photography instead of natural color, making temperature measurements to validate photo data, changes between years in upwelling sites, and what the ABFC's plans were for temperature and dissolved oxygen measurements at identified upwelling sites.

Richard noted that hydrologists predict that the groundwater carries little or no oxygen. Upwelling sites may need a mix of warm groundwater and oxygenated surface water to support fish.

FISH USE OF UPWELLING AREAS

Cal Skaugstad, ADF&G Sport Fish Division, briefed the committee on the importance of upwelling areas to salmon, based on his work as a fishery biologist. Cal said that water temperatures are the key; that is, what makes upwelling areas critical habitat. In the Tanana River system, salmon species can be lumped into two groups. One group, chinook and summer chum, spawn in mid- to late summer, typically on the north side of the Tanana basin. The other group, coho and fall chum, spawn in late summer to early winter, typically on the south side of the Tanana basin. Although the summer and fall spawning peaks occur about 90 days apart, fry from both emerge from stream gravel as free-swimming fish at about the same time. How can this be?

Development of salmon eggs is tightly tied to thermal units (TU[1]). In rough figures, chum salmon require 450 TU to hatch, and 800 TU to emerge as free-swimming fish. Because eggs from fall spawners are in the gravel for fewer days, they need higher temperature water to receive the same amount of thermal input. Cal has been told that there is geothermal warming of groundwater coming from the north slope of the Alaska Range through the Tanana Flats aquifer. Based on his work, Cal believes that warmer water is more important to incubating salmon eggs than water that does not freeze over, since eggs often survive in free-flowing water under stream gravels frozen on the surface. Summer chum salmon spawning places eggs about 6" below the surface. At hatching, the sac fry move deeper in the stream gravel until their yolk sac is depleted and they emerge from the gravels.

Cal said that water temperatures in upwelling areas he has examined have been highly variable (due to mixing with surface water?), with a maximum temperature of about 6°C.

Mark noted that sampled streams in the Interior that are permafrost-influenced do not have more than about 400 TU annually, compared to 700-800 TU in thawed-ground systems, so warm water streams are very important fish habitat.

Bob O. asked whether there were places where surface gravels are dry and frozen in the winter while there are still live eggs below the surface. Cal responded that he had seen such situations in the mouth of the Delta River.

OVERVIEW OF LIKELY TIMBER HARVEST AREAS ON STATE LAND

Steve provided the committee with an overview of commercial timber locations in the Tanana basin. He noted that about 700 ac/yr have been harvested on state lands in the Tanana basin in recent years. Commercial timber was described by management area.

Tok Management Area—Commercial timber is present along the Tok River valley, on the uplands north of the Tanana river, and in the Dot Lake/Johnson Slough area where 20-30 ac/yr have been harvested for several years.

[1] 1 TU = water temperature of 1°C for 1 day. For example, one day of incubation in 6°C water = 6 TU.

Delta Management Area—Commercial timber harvest has occurred in the Gerstle River area for more than 25 years and continues, also in the Shaw Creek drainage (fire salvage then upland nearer the road), along mining road(s) if developed, in the Richardson mining district, the south side of the Tanana River, and the Birch/Harding uplands.

Fairbanks Management Area—Commercial timber is along the Little Chena and Two Rivers areas, the Fairbanks-Nenana ridge, some on Tanana River islands between Bonanza Creek and Nenana, Goldstream uplands, and small amount along the Tanana downstream of Nenana.

Steve predicted that these patterns will continue in the future, largely driven by access issues. If a large user of hardwoods comes into the area, such as a chipboard industry, harvesting would likely head toward the Kantishna or dunes area, Elliott Highway/Goldstream Creek, west of Minto Flats, Delta area hardwood stands, and the Birch Lake/Quartz Lake uplands.

White spruce is the species targeted in current harvests, about one-half of which is from pure white spruce stands. Of the approximately 3.3 million acres in the Tanana Valley State Forest and other state lands with primary or co-primary designations for timber harvest, about 2 million acres is commercial timber. Fifteen percent of that area is pure white spruce, and white spruce makes up 50% of the harvest, so white spruce is largely found in mixed stands. Steve noted that less than 20% of the acreage harvested in a typical year on state lands is in riparian areas.

NOTE FROM THE CO-CHAIRS: Much of this information is available in published form as Crimp et al. 1997.

Marty noted that there have been a few small sales along the Kuskokwim River, from Big River downstream to Devil's Elbow.

Bob O. said that most of the 2,500 Native allotments (5-160 ac each) in the Doyon region, most are in riparian areas. Harvest of timber in allotments is usually piggy-backed onto nearby state sales because the allotment volume is too small typically to pay for construction of much of an access system. Bob said that Tanana Chiefs had small forestry programs on land holdings in the Healy Lake and Nenana areas.

UPDATE ON 319 FUNDING FOR REGION III PROJECTS

Marty said that the three resource agencies had met and developed pooled statewide priorities for 319 funding in FY 00: #1 adequate field staffing for ADF&G and DNR, #2 fish habitat identification in the Tanana (ADF&G), #3 Tanana river dynamics study (DNR/TCC), #4 Tongass roads monitoring closeout (ADF&G), and #5 ice bridges study (DNR). At present, it looks like the first three of these will be funded, which is good news for Region III. Also, DNR's general funds needed to match the federal 319 monies appear to be secure, as well as DEC's authority to receive the federal funds.

MATRIX OF WATER BODY TYPES, FISH HABITAT COMPONENTS, AND POTENTIAL FOR EFFECTS

The committee completed development of a matrix of importance ratings for each of the ten habitat components in a variety of water body types. Ratings were based on best professional judgement, assumed anadromous or high value resident fish were present, and included both importance of the component to fish habitat in each water body type and likelihood that forest management activities would affect that component at the scale of a stream reach.

C3 The committee agreed on the following importance matrix:

4/13/99 Version

Region III Stream Classification Committee

Importance Matrix of Water Body Types and FRPA Habitat Components

Water Body Type	1. Large Woody Debris	2. Stream Bank Stability	3. Channel Morphology	4. Water Temperatures	5. Stream Flows	6. Water Quality	7. Adequate Nutrient Cycling	8. Food Sources	9. Clean Spawning Gravels	10. Sunlight	Comments
A. Glacial Waters (e.g., Tanana R)	**H**	L	?	**H**	**H**	**H**	**H**	**H**	L	L	includes full-time sloughs such as
	M	L	M	L	L	L	L	L?	L	L	Salchaket
B. Sloughs or Oxbows Seasonally or	**H**	**H**	**H**	**H**	**H***	**H**	**H**	**H**	**H*/L**	**H**	photosynthesis is key; emergent veg'n
Partly Connected to Glacial Waters	M	L	L	M	L-M	M	L	L	L	M*	very important
C. Non-glacial Clear Groundwater	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	gravel bed (as opposed to silt); veg'n
Streams (e.g., Richardson Clearw R)	**H**	**H**	**M-H**	L	L-M	L/M*	L	L	**M-H**	M*	does stabilize banks
D. Non-glacial Runoff/Tannic Streams	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H***	**H***	veg'n does stabilize banks
(e.g., Chena R, Goldstream Cr)	**H**	**H**	**M-H**	L-M	L-M	M	L	**H**	**M-H**	L	
E. Lake and Wetland Connections to	**H**	L	**H**	**H**	**H**	**H**	**H**	**H**	L	**H**	silty bottoms; emergent veg'n very
River Systems (e.g., Minto area)	L	M	L	L	M*	L	L	L	L	L	important; road effect since low harvest
F. Clear Upwellings in Glacial Streams	?	L	M?	**H**	**H**	**H**	**H**	**H**	**H**	L	potential effects due to road crossings
	M	L	M	L	L	L	L	L	M	L	(ice bridges, scouring, etc.)
G. Lakes w/ Anadromous and	L	?	**H**	**H**	**H***	**H**	**H**	**H**	**H***	**H**	emergent veg'n very important; effects
High Value Resident Fish	**H**	L	L	L	L	**M-H***	**H**	**H**	L*	L	are due to closed, autotrophic system
H. Non-glacial sloughs and oxbows	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	
	M	M	M	M	L-M	M	L	M	M	**H**	

CHART NOTES: Importance ranks: Upper rank is value to anadromous or high value resident fish habitat in this water body type => **H** / M <= lower rank likelihood of forest management activities influencing that value.

H = high; M = moderate or mixed; L = low; ? = Unknown or not well enough understood to rank.

Channel morphology was restricted to channel geometry (entrenchment, depth to width ratio, etc.).

Water body type B is a subset of type A, and includes reaches that fish can access from the main river at least seasonally, and that mix with glacial water at least seasonally.

*CELL NOTES for importance matrix cells flagged with an asterisk:

B10, C10 – may increase productivity if sunlight increases

C8 – driven by primary production; highly productive streams, with large amounts of benthic algae since no scouring flows

C6, D6 – low likelihood for harvest, moderate for access roads

C9, D9 – freeze-down issues?

D5 – removing timber would likely increase snow load and runoff flows

E2 – moderate likelihood of impact from waterbody crossings

E5 – moderate likelihood of impact to winter flows and maintenance of fish passage

G6 – likelihood of impacts depends on size of water body

G6, G7, G8 – effects depend on extent of harvesting in watershed

G9 – if cleared large areas off for staging or access due to freeze-down in shallow areas

H6 – due to ice bridges

H7 – flow driven

H9 – due to lack of flushing ability

John noted that, from a hydrology standpoint, clearwater systems, (e.g., Delta Clearwater River) are primarily recharged from waters from mountain slopes that have passed primarily through gravels with some frozen silts on top. Therefore, he does not believe that surface activities could affect the quality of such subsurface source waters.

Mike said that the rate of change in water temperature is as important to fish as whether the waters are hot or cold. He also said that small channels that connect lakes to stream can be used by fish to leave the lake if dissolved oxygen levels drop. If access in these small channel were to be blocked by freeze-down due to roads, this could lead to problems for the fish.

The committee noted that upwelling areas (F in the matrix) are a subset of glacial mainstem waters (A in the matrix) for the most part.

Torre asked how other resource values (e.g., waterfowl habitat) are addressed at present on water bodies that do not contain habitat for anadromous or high value resident fish. Marty replied that such issues are primarily addressed on state lands by land use planning documents and in forest land use plans (FLUPs) for individual timber sales.

The committee agreed that their general presumption, used while completing the matrix, is that vegetation does not play a role in bank stability or channel morphology except for non-glacial clearwater and non-glacial runoff streams (C and D in the matrix).

REGION III WATER BODY TYPE CLASSIFICATION SCHEME

Once the matrix was completed, the committee began the process of moving from an importance matrix to a stream classification scheme.

Marty asked the committee whether there were water body types that could be combined, and to look for areas where both importance and risk were high.

Bob O. suggested merging glacial mainstem (A) with upwelling areas (F), and address upwelling areas specifically in BMPs or regulations for access issues in relation to spawning gravels.

The committee agreed that the geomorphology and hydrology of clearwater runoff streams (C) and non-glacial runoff streams (D) are too different for the types to be combined.

Marty said that Jim R. had suggested to her by telephone earlier the we might lump types such as all glacial water bodies into a group. She also briefed the committee on the management prescriptions for different water body types in Region I. Riparian areas along anadromous waters are protected by buffers, slope stability standards, and BMPs. Tributaries to those water area covered by slope stability standards and BMPs. Other surface waters have BMPs alone.

The committee discussed whether or not it would be appropriate to lump or split sloughs and oxbows, and lakes, that are glacial and non-glacial. In the end, they decided to add an additional

water body type (H) to the matrix for non-glacial sloughs and oxbows, and to not make a separate category for different types of lakes.

C3b The committee established the following water body classification system for forest practices in Region III ("fish" means anadromous or high value resident fish):

I. Glacial waters with fish
    A. Main and side channels (including upwelling areas)
    B. Oxbows and sloughs along major rivers
II. Non-glacial waters with fish
    A. Clear groundwater streams
    B. Runoff streams
    C. Oxbows and sloughs
    D. Lake and wetland outlets
III. Lakes with fish
IV. Other surface waters

The committee agreed that it will be necessary to review this classification scheme with other groups for their input, including affected interests (agency and industry folks), the Tanana Valley State Forest Citizens Advisory Committee, and the Board of Forestry.

Marty charged the **committee members** to read and understand Article 3 (Road Construction) and Article 4 (Timber Harvesting) of the FRPA Regulations before next meeting.

Marty summarized discussions she has had with several committee members that the Stream Classification Committee is now moving from one set of tasks (development of a stream classification system) to another (review of existing riparian standards for forest practices). Therefore, it is an appropriate time to consider whether or not the committee's compositions should stay the same. It could be that some members are not interested in developing riparian management recommendations, or that there are people who need to be a part of such discussions.

Committee members are to notify the co-chairs of any potential group member changes by April 23.

SUMMARY

At this meeting, the committee:

- Learned of the extent and location of commercial timber resources in Region III;
- Completed an initial assessment of two issues: importance of habitat components to fish habitat by water body type, and likelihood of sensitivity to forest management activities; and
- Developed a water body type classification scheme based on that assessment.

NEXT MEETING

At the next meeting, set for **Tuesday May 4, 1999,** at the ADF&G large conference room, the committee:

- Will define the stream types identified in the classification scheme;
- Review existing statutes, regulations, and best management practices (BMPs) applicable to protection of fish habitat and water quality in Region III riparian areas;
- Consider any necessary changes to those statutes, regulations, and best management practices (BMPs; and
- Identify appropriate management actions to adequately protect fish habitat and water quality to meet the riparian management intent of AS 41.17.115.

MEETING #2 HANDOUTS

Crimp, P. M., S. J. Phillips, and G. T. Worum. 1997. Timber resources on State forestry lands in the Tanana valley. Alaska Department of Natural Resources, Division of Forestry. 80 pp + Appendices.

Maurer, M. A. 1999. Water quality study of Richardson Clearwater Creek near Big Delta, Alaska. Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys. Public-Data File 99-21. 26 pp.

Alaska Forest Practices Act Review – Final Report. June 1989. DNR Division of Land, Land & Resource Section.

REFERENCES CITED

Frissell, C. A., W. J. Liss, C. E. Warren, and M. D. Hurley. 1986. A hierarchical framework for stream habitat classification: viewing streams in a watershed context. Environmental Management 10:199-214.

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #3; May 5, 1999
ADF&G Large Conference Room, Fairbanks, AK

Attendance
Bob Burrows, USGS
Steve Clautice, DNR-DOF
Mike Doxey, ADF&G-SF
Jim Durst, ADF&G-H&R, co-chair
John Fox, UAF
Torre Jorgenson, ABR
Steve Joslin, DNR-DOF Delta
Chris Maisch, Tanana Chiefs
Mark Oswood, UAF
Bob Ott, Tanana Chiefs
Deanne Pinney, DNR DGGS
Dave Valentine, UAF
Marty Welbourn, DNR, co-chair

Visitors
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council

Note: Points of consensus are shown with a **C.** Work commitments/assignments are shown in a box with the responsible person's name in **bold**. Handouts referenced in the minutes are available from either co-chair; some are quite lengthy.

MINUTES FROM MEETING #2

The committee reviewed, amended, and approved the minutes from the April 13, 1999, meeting.

UPDATES

Upwelling mapping. Richard McCaffrey summarized progress on the upwelling mapping project for the Boreal Forest Council (BFC). A second series of photos was flown on April 11, 1999 to include more of the south bank of the Tanana, including the Richardson-Clearwater River. The BFC will meet with agency representatives to review the photos this week, and are scheduled to conduct a field verification check on May 7. During the field check, they plan to use a water quality probe to measure temperature, dissolved oxygen, conductivity, and other water quality characteristics at a site that appears to be actively upwelling. They hope to test whether the water is oxygenated where the groundwater hasn't previously been exposed to the air. Mark Oswood suggested that the field trip also look for visual clues of anoxic upwelling water, such as red deposits from iron. Chris Maisch noted that even if we don't fully understand how the upwellings provide spawning and overwintering habitat, we will still need to protect these areas since they are important for spawning.

Likely harvest areas on Native land. Chris handed out a map showing villages that have conducted timber inventories, and larger forest stewardship planning areas on Doyon land. He noted that all villages do some subsistence timber harvesting. The volume of this use is likely to increase since HUD housing grants now allow use of local wood. Some villages are interested

in small mills for local lumber (to produce 250-500 MBF/year). Fort Yukon and Circle have active projects to use the local lumber, and other villages may be interested.

The main commercial timber harvest on Native land has been on Togotthele land near Nenana. They are likely to harvest a total of 10-20 MMBF over the next 10 years. Past harvesting also occurred near Healy Lake and Dot Lake. Tetlin harvested wood burned in the Tok fire. Little increase in commercial harvesting is expected in the next 5-10 years. There is some current interest in a mill that would use up to 5 MMBF of upland hardwoods from villages on the road system.

KEY FOR DRAFT REGION III WATERBODY CLASSIFICATION SYSTEM

The committee discussed and developed a key for the draft Region III waterbody classification system. Chris noted that the key needs to be usable year-round. Some areas are visited only in the summer or only in the winter. Bob O. and Mark noted that some information is available from maps or reports.

Bob O. asked about the classification of waters such as the Yukon. He stated that this should be classified a glacial waterbody because the portion of the water in the river that is glacial influences the river throughout its length (e.g., in terms of sediment load and temperature). He noted that in the Tanana Basin glaciers have a disproportionate influence on downstream waterbodies because the input from precipitation is low compared to the input from glacial waters. The relative importance of glacial input in Susitna Basin waters is less because of more abundant annual precipitation.

C4 The committee agreed that waters that receive input from glaciers should be classified as glacial, even if they receive a mix of glacial water and water from other sources. (See also example of waterbodies for classification types, below.)

Steve J. asked about classification of waters that have segments that are seasonally dry and not fish-bearing even for migration, but have reaches upstream of the dry areas that support resident fish where there is input from groundflow or tributaries. The Gerstle River has examples of this situation. Marty noted that different reaches can be classified differently – a non-fish-bearing reach would be classified as "other surface waters", but the upstream reach would be classified on the characteristics of that reach.

Bob B. said that groundwater streams are discernible from other stream classes because they have very stable flow rates – high water marks are absent, and there is no evidence of stage changes. They also typically have open water in winter.

The committee discussed the appropriate definition of backwater slough at length. "Slough" can be a confusing term, because many waters called "sloughs" on topographic maps are actually side channels of the main glacial rivers.

C5 The committee agreed that in this classification system a "backwater slough" is a waterbody that has sluggish flow, is warm in summer, and typically is only connected to the main stem or a side channel at one end. A backwater slough carries river current only under high water conditions, and may have only a seasonal connection to the main stem or side channel.

Examples of waterbodies by class

I. Glacial

A. Main channels, side channels, highwater channels, and upwellings

Note: A number of waterways called "sloughs" on topographic maps are side channels under this classification system.

- Tanana River
- Kuskokwim River
- Yukon River
- Teklanika River
- Toklat River
- Salchaket Slough
- Phelan Creek
- Tok River
- Nenana River
- Chisana River
- Delta River
- Little Delta River
- 17-Mile Slough (Nenana)
- Gerstle River
- Robertson River
- Wood River
- Swan Neck Slough

B. Backwater sloughs

- Totchaket Slough
- Many unnamed backwaters along the Tanana R. and possibly along the Nenana and Kantishna rivers

II. Non-glacial

A. Clear groundwater streams

- Richardson Clearwater River (and some unnamed tributaries)
- Fivemile Clearwater River
- Delta Clearwater River
- Julius Creek
- Piledriver Slough

B. Surface runoff/tannic streams

- Lignite Creek
- Chena River
- Salcha River
- Goodpaster River
- Chatanika River
- Shaw Creek
- Hess Creek
- Birch Creek
- Tolovana River
- Goldstream Creek

C. Backwater sloughs

- mostly unnamed – examples occur in the Chena system

D. Low-gradient lake and wetland outlets that connect to streams
   - connector between Minto Lakes and Goldstream Creek
   - Healy Lake outlet to Tanana River (unnamed)
   - Medicine Lake outlet (unnamed)
   - many unnamed streams in wetland complexes, e.g., in Lake Minchumina area

III. Lakes

- Birch Lake
- Harding Lake
- Healy Lake
- Medicine Lake
- Volkmar Lake
- Quartz Lake
- Deadman Lake
- George Lake

IV. Other surface waters (no populations of anadromous or high value resident fish)

- Black Lake
- Smith Lake
- Acey-Deucey Lake
- Little Gerstle River
- upper reaches of Cache Creek
- upper reaches of Caribou Creek
- upper reaches of Spinach Creek

EXISTING STANDARDS IN REGION III

Marty handed out a chart summarizing existing riparian management standards in Region III. There are three categories of standards – buffers, slope stability standards, and best management practices. Region III buffers are 100' wide. On state and other public land, harvesting must be avoided in this zone unless DNR, with due deference to ADF&G and DEC, determines that harvesting can occur without adversely impacting fish habitat or water quality. On private land, harvesting within this zone must be designed to protect fish habitat and water quality. Slope stability standards only apply to public land in Region III, and to anadromous waters and high value resident fish water bodies. [Note: Proposed regulation changes would also apply these standards to tributaries to these waterbodies.] The slope stability standards were designed primarily to avoid mass wasting and introduction of sediment and debris into surface waters, mainly in consideration of the steep slopes and high rainfall in the Coastal Region (Region I). Most of the provisions in the slope stability standards are also addressed in BMPs that apply to all land ownerships, with the exception of the retention of low-value and non-merchantable timber where feasible. The BMPs have applicability thresholds based on the size of the timber harvest operation, and whether or not surface waters are within or adjacent to the units or access roads.

The committee had a brief discussion of the risk of mass wasting in Region III. It is less common than in southeast Alaska, but there is some risk where slopes underlain by permafrost are disturbed. For example, slumping has occurred following fire or road construction on permafrost-laden slopes.

The committee identified the following riparian management issues in Region III.

- Appropriate buffer standards by waterbody class.
- Management of harvest along glacial rivers
- Applicability of slope stability standards to Region III
- Riparian management in permafrost areas
- Forest management, especially winter access, near upwellings
- Winter access, especially ice crossings of waterbodies.

BUFFERS

The committee began discussing appropriate buffer standards for waterbody classes in Region III, starting with the glacial water body classes.

Class I.A. – Glacial – Main channels, side channels, highwater channels, and upwellings

Chris said that buffers aren't essential on glacial rivers – vegetation doesn't control erosion, and the amount of potential large woody debris (LWD) removed by harvesting is insignificant relative to the total source of large woody debris. The proposed Section 319 project on river erosion along the Tanana will help assess large woody debris recruitment in this system. Periodic checks of LWD may be needed.

Jim Durst noted that we should recognize the lack of existing research. In some large river systems in southeast Alaska such as the Stikine, biologists believe large woody debris, especially trees with boles attached, is needed. However, there are no studies of the role of LWD in these systems even in southeast Alaska. John Fox mentioned a reference to a study in Oregon[2] that documented changes to a large river channel when snags and streamside large trees were removed.

John also noted that Region III is a disturbance-driven system, and that buffers may not last long anyway due to erosion, fire, and insect attack.

Mark asked about integrity over time of narrow buffers. Chris responded that some trees in buffers are lost due to bug kill, sun scald, or blowdown, but that the buffers are generally secure. Bob Ott added that the impact of wind on buffers is likely to be variable by stand opening design, and location. High winds are common in the Delta area and buffer blowdown would likely be more common there.

Dave recommended relaxing the buffer standard on these systems. We don't know all the information on whether buffers are beneficial or the possible impacts of no buffers, however we currently have no knowledge demonstrating a need for buffers on these systems. Chris reiterated that the risk of not requiring buffers on these systems is low, because the amount of LWD input from natural erosion dwarfs the amount removed by harvesting, and because vegetation doesn't control erosion on the glacial rivers.

Fred Dean asked whether buffers are important to the stability of islands in glacial channels. Steve J. responded that the Tanana River islands that support forests were formed under different conditions than currently exist – they are higher elevation and were formed in higher water conditions than currently occur. A past harvest of trees in an actively eroding area appeared to slow erosion; by removing the boles, undercut root wads were less likely to wash downstream. Trees are not protecting the islands from erosion – large forested islands have been lost from bank erosion. Bob O. concurred that the flood regime on the Tanana has changed – bigger floods occurred hundreds of years ago. He cited an example where an eroding bank exposed stumps, dated at 700 years old, from an ancient forest that was flooded. With more glacial melting in the current warm period, flood levels may increase again.

Chris noted that the main source of LWD in these systems is bank erosion along the main channel rather than along side channels. LWD found in side channels is largely washed in from the main channel.

Mike Doxey noted that the importance of these systems to fish relates to the water velocity. We know very little about fish overwintering habitat requirements in the Tanana River. The primary use of the main and side channels is migration, resting, overwintering, and spawning for burbot.

[2] Sedell, J.R., and Froggatt, J.L. 1984. Importance of streamside forests to large rivers: The isolation of the Willamette River, Oregon, U.S.A., from its floodplain by snagging and streamside forest removal. Verh. Int. Verein. Limnol. *Int. Assoc. Theor. Appl. Limnol.* 22: 1828-1834 as cited in Waring, R.H. and W.H. Schlesinger. 1985. *Forest Ecosystems: Concepts and Management.* Academic Press. pp. 252-254.

Mark recommended that the agencies provide the Board of Forestry with the best information available when the buffer recommendations are presented. In particular, summarize current information on erosion rates, harvest activity levels, and the proportion of the river bank along the Tanana that is available for harvesting. Any distinction in buffer recommendations based on land ownership is a policy decision that can be made by the Board, since there is no scientific bases for such differences.

Consensus points for buffers on Class I.A. – Glacial main stems and side channels

C6 Buffers should not be required unless site-specific factors indicate that a buffer is needed to provide large woody debris or other habitat components for fish. The chart titled "Importance Matrix of Water Body Types and FRPA Habitat Components" in the minutes from meeting #2 identifies key habitat components for each stream type.

C7 The need for buffers should be reevaluated if there is a significant increase in the level of harvesting along glacial rivers.

C8 Additional research is needed on the role of LWD in glacial river systems.

C9 Based on current information, buffers are not required to protect fish habitat or water quality on this water body class because

- bank erosion is not controlled by vegetation,
- harvesting at current or projected levels won't significantly affect the input of large woody debris to these systems, and
- these systems do not provide spawning beds except in limited areas, such as groundwater upwellings.

C10 The committee recognized that specific management standards are needed for upwellings; these standards will be discussed at upcoming meetings.

Class I.B. Glacial – Backwater sloughs

In contrast to the Class I.A. glacial channels that have strong flow of glacial waters, Mark stated that in the backwater sloughs attached to glacial waters

- LWD is known to be important,
- Wood adjacent to the banks is the main source of LWD – it doesn't wash in from the main channels, and
- Shade is important since these water bodies are sluggish and heat up in the summer.

The committee concurred that buffers are needed on this waterbody class. (See buffer chart for consensus points.) The committee discussed the appropriate buffer width for this class. Based on work from other areas, most LWD comes from a distance of approximately 2/3 of the tree height in relatively flat terrain. Most mature tree heights are in the 70-80' range, with some up to 100'.

John Fox noted that the maximum summer sun angle in the Tanana Basin is approximately 48 degrees. At the maximum sun angle, a 70' tree on the bank of a slough would cast a shadow slightly shorter than 70'. The shadow from a 70' tree 70' back from the bank would not quite reach the stream bank. At lower sun angles, the shadow would be longer, and vegetation

further back could contribute to shading. Shading is also affected by topography and by the streambank itself. Estimated slough widths are typically 20'-100'.

C11 Based on tree height and sun angles for shading, the committee recommended a 66' no-cut buffer along this water body class. This distance is one chain which is also easy to measure in the field and consistent with buffer widths on anadromous streams in Region I.

Chris and others estimated that a 66' buffer in Region III would typically be 6-12 trees wide.

ICE CROSSINGS

The committee had a short discussion on ice crossings near upwellings. Bob B. mentioned that some data on the impact of ice crossings on stream flow will be available from studies of discharge on the Goodpaster above and below crossings used this past winter (1998-99).

Steve J. described conditions of water levels in the Tanana. He said that fall flows are low, and then rise as ice is formed. He cited a rise in water levels of 50" from October to March in portions of the Tanana. Water levels recede after ice out. Bob B. concurred that freezing shrinks the available flow channel, causing hydraulic pressure that raises the water level. Steve J. said that DOF wants natural ice depths of $\geq$30" before constructing ice crossings, and that upwellings are avoided because they don't develop that much ice.

Jim D. said that Carl Hemming and Bill Morris of ADF&G had visited five isolated side channel and pool sites on the south side of the Tanana River on May 15, 1998. Open water connections to each site had been broken as water levels dropped the previous fall, and the Tanana had not risen enough to reconnect them that spring. Young of the year chum salmon were captured at two sites, indicating spawning at that location the previous fall. Overwintering resident fish species captured were longnosed suckers, lake chum, Arctic grayling, slimy sculpin, and burbot.

NEXT MEETING

The next meeting is set for Thursday, June 3, 1999. Location TBA. The agenda will address the issues identified in the following order

- Continue discussion of buffer recommendations by waterbody class
- Management of harvest along glacial rivers
- Application of slope stability standards in Region III
- Management standards for permafrost areas
- Management standards for upwellings.
- Management standards for winter access and ice crossings.

FAREWELL!

Mark Oswood is retiring and moving to Washington. He will be missed by the committee for his broad knowledge of aquatic ecosystems in Interior Alaska and his good humor. We will keep him in touch through e-mail and minutes, and (if he's willing) by teleconference.

Handouts
Green Book II
Map of Native village timber inventories
Chart of existing Region III riparian standards

cc: Jeff Jahnke, DOF
Les Fortune, DOF
Ken Taylor, ADF&G
Tom Chappell, DEC

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #4; June 3, 1999
DNR Large Conference Room, Fairbanks, AK

Attendance
Amy Ash
Bob Burrows
Steve Clautice
Mike Doxey
Jim Durst
Steve Joslin
Chris Maisch
Bob Ott
Jim Reynolds
Dave Valentine
Marty Welbourn

Visitors
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council

Note: Points of consensus are shown with a **C.** Work commitments/assignments are shown in a box with the responsible person's name in **bold**. Handouts referenced in the minutes are available from either co-chair; some are quite lengthy.

MINUTES FROM MEETING #3

The committee reviewed, amended, and approved the minutes from the May 5, 1999, meeting.

UPDATES

319 Funding. Marty said that the legislature approved the FY00 319 funding for DNR and ADF&G Forest Practices staffing, and for the first phase of the Tanana River Dynamics and Tanana Fish Habitat research projects. We expect the funds to be available after July 1, 1999.

Upwelling mapping. Richard McCaffrey summarized progress on the upwelling mapping project for the Boreal Forest Council (BFC). BFC staff and Bill Morris from ADF&G visited an active upwelling area at Bluff Cabin Slough to measure temperature and dissolved oxygen (DO). The upwelling temperature was 4-5 degrees Celsius and DO was about 80%. It is not clear how the ground water is getting oxygenated. Bob B. says that he has measured groundwater at other sites and found it anaerobic. He hypothesizes that oxygenation begins as the groundwater flows through gravels near the surface – motion (water flow) and exposure to air are needed to oxygenate the ground water.

Review of recommendations from May 4 meeting

Jim D. asked whether it was most appropriate to call the categories in the committee's classification system stream classes or stream types (as is the case for water bodies in Region I). Jim R. said that "type" usually refers to functional aspects of an aquatic system, while "class" typically refers to physical characteristics. Therefore, the committee has developed a system of stream classes.

Mike D. said that he was concerned about lumping all glacial waters. He distributed copies of an air photo of a segment of the Nenana and Teklanika rivers. The Teklanika had an example of a meander that is likely to be cut off, forming an oxbow lake. Under the classification system and recommended buffers, the lake would be treated differently than the glacial river. He asked whether proposals for forestry activities should reflect the likelihood that an oxbow will be formed, and apply the lake standards rather than those for the glacial river. He also noted that some glacial waters such as parts of the Nenana run clear seasonally and support coho spawning.

In the following discussion, Chris M. said that it is difficult to guess what will occur and how long it will take for the meander to actually be cut through. Some narrow peninsulas take decades to be cut. Bob O. noted that these systems are dynamic and we only have a snapshot of their changes. Bob B. said that the need to vary the standard for glacial rivers in some cases is already included in the buffer recommendation which allows for requiring a buffer if merited by site-specific circumstances (see **C6**). The issues can be addressed during interagency review or an inspection. Dave V. said that the recommendations should address existing fish habitat rather than possible future habitat.

Chris M. asked how long it takes to convert a meander to a backwater slough. Bob B. responded that it depends on stream gradient and bed load. One example in the Chena River made that change in a year due to steep gradient and high gravel load. The Teklanika example might take a few seasons. Deposition will take place quickly at the upper and lower ends of the oxbow. Mike D. added that as soon as the water clears, silt is moved down the new channel rather than through the oxbow, and some vegetation emerges, pike will begin to use the oxbow. He said he might recommend harvesting to accelerate the process of isolating the oxbow and creating fish habitat. There was discussion without resolution of whether or not tree removal would accelerate erosion at the neck and speed oxbow formation. In the Teklanika example, Bob B. said that leaving the trees would slow down but not prevent the neck cutting through, Bob O. noted that other trees remain for cover on the opposite bank, and Chris M. added that secondary succession would occur quickly to provide shade.

The committee agreed to edit consensus point #6 to recognize that site-specific conditions might merit buffers on glacial waters to provide other functions than LWD. The new language follows:

> **C6 (amended)** Buffers [on class I.A. glacial waters] should not be required unless site-specific factors indicate that a buffer is needed to provide large woody debris or other habitat components for fish. The chart titled "Importance Matrix of Water Body Types and FRPA Habitat Components" in the minutes from meeting #2 identifies key habitat components for each stream type.

The group reconfirmed that with the flexibility in C6, additional glacial water types did not need to be split out. The group also agreed that the chart of key habitat components should be distributed to field people, and should accompany the buffer recommendations.

The glacial waters typically have lower fish habitat value. Bob B. noted that other than backwater sloughs or upwellings, the glacial waters are used mostly as migration routes. Jim D. noted that we have limited information on fish use of interior glacial waters and that as we learn more we are finding more use. Mike D. said that fish using main channels on wide reaches like the Yukon wouldn't be affected by harvest, but small, narrow reaches may be different. Jim R. noted that in studies with Doug Mecum they found small resident fish in the Tanana River such as lake chub, juvenile whitefish and pike, and small burbot. These were typically on the fringes of the main channel where the river slowed or where there were deep holes on the bottom. Bob B. added that these are sites where the river slows and sediment concentrations decrease with the decreased water velocity. Jim D. reported that studies of the glacial Taku River in southeast Alaska found rearing chinook in the main stem, for example in eddies behind root wads. The young chinook were able to coexist with coho, possibly because the silt prevented them from seeing each other. We don't know what they are eating in these systems. Rearing salmon have also been reported in the Frasier and Stikine, but were not found in the Tanana River studies in 1996-97.

Buffers for Class II waters

The committee discussed appropriate buffer recommendations for non-glacial (class II) waters. Bob B. said that the same factors apply to these waters as to the glacial backwater sloughs – they need large woody debris (LWD) and shade to maintain productivity for fish. Bob O. added that the committee previously agreed that classes II.A. (non-glacial clear groundwater streams), II.B. (non-glacial surface runoff or tannic streams, and II.C. (non-glacial backwater sloughs) all could be impacted by forestry activities, and that they need the same buffer as the glacial backwater sloughs for bank stability, LWD, food, and sunlight/shade.

Jim D. said that ADF&G questions the appropriateness of the 66' width on the recommended buffer rather than the 100' in the current regulations for public land. Chris M. noted that Region III tree heights are typically 60-70', so that a 66' buffer actually approximates full tree height in most cases rather than the 2/3 tree height that has been shown to provide most of the LWD. Jim D. noted that because of low sun angles, trees farther back from the stream may contribute to shade.

Bob O. asked what the background was for the 100' width in the regulations. If the same rationale is used in Region III as in southeast Alaska, the science would justify 50-60' based on tree height and sun angles.

Bob B. noted that sedimentation is also important on the non-glacial waters whose natural sediment loads are lower. He also noted that sedimentation is primarily from roads and possibly hillslope logging. Marty W. stated that the best management practices (BMPs) in the regulations are designed to prevent sedimentation from roading and logging, and the BMPs apply to all regions. Jim D. said that because buffers can act as a sediment sponge a 100' buffer might be

beneficial. Bob O. suggested that if there is a reason for buffers wider than 66' that it would be for filtration. Steve C. added that the key for controlling sedimentation is the steepness of the slope above the stream, and the condition of the ground cover rather than the tree cover. With common logging practices, especially in the winter, logging causes little disturbance to the ground cover. Bob O. concurred that sedimentation control is a ground vegetation issue except for downed trees that act as sediment traps. The question is at what point harvest would affect ground cover. Steve J. noted that in the Sawmill Cr. drainage the creek flooded and flowed through the woods. He observed less impact from the floodwater where the stand had been opened and grass cover increased than under the forest cover.

Chris M. observed that there are few places in the Tanana Basin where harvesting will occur along non-glacial waterbodies because of the land ownership and land designation patterns. Steve C. concurred, but noted that some smaller streams in the Tok area could have operations nearby. Jim D. added that fish typically occur only in the lower reaches of these streams.

Bob O. said that for LWD recruitment, 60-70' is the maximum needed. For shading more might be needed because of light penetration through the lower boles at low sun angles, although understory vegetation also contributes to shading in these conditions. Chris M. added that in moving waters, stream temperature might not be key to fish productivity.

Jim D. expressed uncertainty about the integrity of buffers – would they get blown down? What is needed to keep buffers windfirm? He added that in southeast Alaska, increased sunlight to the forest floor following harvests on adjacent land dried the ground cover and increased the volume and turbidity of runoff. Steve C. agreed that feathermosses can die back in that situation in the Interior, but that it stays in place. Chris M. stated that much of the filtering capacity would remain unless the ground cover is burned. Bob O. said that 1-2 rows of trees can be lost at the edge of the buffer adjacent to the harvest area due to sunscald following harvest, and that it takes some time for the trees to become windfirm. Chris M. added that sunscald occurs on the harvest side of the buffer, not the stream side, and that *Ips* beetle damage can also occur 1-2 trees deep adjacent to the harvest area. Steve J. added that trees close to the stream are usually windfirm because of their exposed position. Bob O. volunteered to calculate the widths needed for shading and to report back at the next meeting. Marty W. also noted that there are local differences in wind characteristics – for example, the Delta area is commonly subject to higher wind velocities that other parts of the Tanana Basin.

Bob O. noted that Tanana Chiefs have been monitoring three riparian buffers in the Tanana Basin. So far there hasn't been windthrow loss in the study sites, although some was observed across the river. He said that wind isn't a big issue on most Interior sites, and that wind events are very localized, and are significant primarily in the Delta area and in passes. If additional trees are left for windfirmness, it should be on a site-by-site basis. A narrow buffer (e.g., 33') might be lost to wind but wider buffers would not likely be downed in a single event. TCC did some testing of buffers with a 33' no-cut zone plus a 33' partial harvest zone. Bob O. added that feathering buffer edges hasn't worked well if the edges haven't become windfirm prior to the first major wind event.

Steve J. noted that some southeast studies suggest that windthrow in buffers may be a source of short-term LWD, but Jim D. added that it's uncertain whether windthrow depletes long-term LWD.

Jim R. raised the issue of increased organic sediments and dissolved organic matter in waters adjacent to harvest areas. Increased organic matter increases oxygen demand in waterbodies and could be a problem in waters that experience periods of low dissolved oxygen. Even streams with good riffle/pool systems can have oxygen deficiencies in low-water periods. Steve J. noted that winter skidding operations haven't caused debris movement, even in gullies. In winter harvests branches break easily during skidding and the debris helps slow water movement. Jim R. said there is some information on how far dissolved organic matter travels in groundwater, but that the data are from systems with higher precipitation regimes in Washington and Oregon. Bob. O. noted that leachate movement is seasonal, peaking during breakup, especially over frozen ground, and in rainy periods in August. Jim R. stated that leachate transport is a short-term (one season) problem. Bob O. noted that a 50' distance might be too small to prevent leachate from entering streams based on leach field data. Jim R. and Bob O. will try to find additional information on the issue of how far leachates can travel, and what slope gradients could cause problems.

Bob O. asked whether organic matter input is also a problem in glacial backwater sloughs. Jim R. said that these sloughs are heterotrophic systems, not clearwater autotrophic systems where lack of respiration is a problem for maintaining photosynthetic organisms.

> **C12** The committee agreed that buffers are needed for non-glacial classes II. A., II.B., and II.C. Buffer design for these classes should incorporate concerns for large woody debris, shade, bank stability, channel morphology, and prevention of sedimentation. Shade provides cover for small fish along banks and controls temperature increases in sloughs and other waters with slow flows.
>
> **C13** A 60'-70' buffer width is adequate to provide large woody debris in these buffers based on most debris coming from within a distance from the bank equal to 2/3 of maximum tree height.
>
> **C14** No-cut buffers on class II.A., II.B., and II.C. waters should be a minimum of 66'. The width may be increased when needed to control sedimentation from steep slopes adjacent to the water bodies.

The committee agreed that the width needed to prevent leaching of organic matter and sedimentation from steep slopes adjacent to waterbodies needs to be assessed (Jim R., Bob O., and Dave V. will look for information on this issue). The width needed to provide shade to prevent temperature increases on class II.C. waters (non-glacial backwater sloughs) also needs to be assessed (Bob O. will calculate shading based on sun angles and typical tree heights).

Jim R. noted that LWD recruitment is a short-term annual event. He also asked whether we know whether the LWD in these stream types comes from the adjacent bank or is transported from upstream. Chris M. noted that upper reaches of streams in Region III often have little large

timber along their banks and therefore aren't major sources for large woody debris. Bob O. added that in the large glacial systems we expect transport of LWD but in smaller systems more of the LWD is locally produced. Marty W. noted that the same question has been raised in southeast Alaska and proposals have been submitted for 319 funding to study this question as part of ongoing effectiveness monitoring. Information from the lower 48 showed that transport mostly occurred in large, higher velocity streams. Fred Dean also noted that beaver contribute to LWD in Interior streams and can transport it some distance from the stream bank.

Steve J. noted that skidding and roading is typically not done parallel to the edge of the harvest unit. This lack of roading close to buffer edges, combined with winter operations, means there is little disturbance to the vegetative mat near buffers, and little sedimentation is expected. Steve C. added that little harvesting in Region III occurs on steep slopes near streams. Steve J. noted that fire took down trees along Providence Creek in the Delta area. It could be studied for the influence of the tree loss on the stream. There is little LWD from trees more than 40' from the stream; tree height averages about 65' in this area.

Buffer recommendations along class II. D. waters (non-glacial low-gradient outlets to lakes or wetlands

Bob O. said that impacts from access are the main concern along these waters. Steve C. stated that the main benefit of buffers is for LWD since the flow into these systems is from lake water which is not typically shaded and not sensitive to temperature increases from removal of stream bank cover. Most of the banks are unforested.

> **C15** A 66' no-cut buffer is needed on class II.D. streams to provide large woody debris.
>
> **C16** Commercial forests and harvesting are uncommon along this water body class.

Buffer recommendations along class III waters (lakes)

Jim D. added that there is little available LWD in lakes, and what does occur is important and needs protection. Mike D. said that LWD is dragged in by beavers.

Richard McCaffrey asked whether lakes were a special concern since they are collection areas for hydrological impacts throughout their basin. Bob O. said that lakes are settling areas, and that sediment input from streams winds up in the lakes. Lakes are highly productive and susceptible to impacts because of effects higher in the watershed.

Steve J. asked whether there is information to document that sedimentation is likely to occur from harvests in Region III, given the lack of skidding and roading parallel to the harvest unit boundaries. Chris M. said that most harvesting is now done with grapple skidders and feller-bunchers which cause little disturbance to the vegetative mat, especially in winter operations. Steve C. said that these techniques cause little disturbance even in summer operations. Bob O. said that the big issue is where there is permafrost on slopes adjacent to a water body.

C17 A minimum of a 66' no-cut buffer is needed to provide large woody debris, nutrients, and food sources. The buffer width may be increased where needed to control sedimentation from steep slopes.

Other surface waters

Marty W. noted that the best management practices in the regulations apply to protect water quality on other surface waters (waters without anadromous or high value resident fish). Buffers do not apply to these waters.

Slope stability standards in Region III

Marty reviewed the existing slope stability standards (11 AAC 95.280). At present these standards apply within 100' of anadromous and high value resident fish water bodies in Region III; they do not apply on private land. The slope stability standards have five provisions (11 AAC 95.280 (d)(1)-(5)), four of which are also covered in the BMPs that apply to all lands.

1) 11 AAC 95 (d)1) directs operators to avoid constructing a road that will undercut the toe of a slope that has a high risk of slope failure. The BMPs in 11 AAC 95.295, .305, .315, and .345(b)(5) also address construction and maintenance of roads and landings in sensitive or unstable areas.

2) 11 AAC 95 (d)(3) requires full or partial suspension in yarding operations. The BMPs for cable yarding and tracked and wheeled harvest systems in 11 AAC 95.360-.365 also cover suspension requirements and harvest operations in riparian areas.

3) 11 AAC 95 (d)(4) requires that timber be felled away from streams in V-notches. Felling and protection of V-notches are also covered by 11 AAC 95.290(e), .300(a)(7), and .360 (b)(4).

4) 11 AAC 95 (d)(5) stipulates that operators avoid sidecasting displaced soil from road construction to the maximum extent feasible. The BMPs in 11 AAC 95.290(d) and (i) also cover sidecasting.

5) Only 11 AAC 95 (d)(2), which requires, in the operator's discretion, retention of low-value and non-merchantable timber where feasible to reduce the risk of mass wasting, is not duplicated in the BMPs.

Discussion. Chris M. said that full suspension (#3) doesn't apply to the non-cable harvesting systems that are used in the Interior. However, Steve C. added that partial suspension could apply to any system that keeps one end of a log off the ground, including shovel yarding and grapple skidding. He also stated that requiring partial suspension could limit the ability to do partial cuts in riparian areas.

Steve C. also asked whether the slope stability standards are needed in the Interior where operations are not on steep slopes. Jim D. said that the slope stability standards won't make

much difference on relatively flat terrain except possibly along an access road. Steve C. said that the main effect would be on glacial streams where a buffer isn't left. The standards add little to protection in these cases. Bob O. agreed that leaving low-value timber doesn't stabilize banks along glacial streams. He said that except for the low-value timber requirement in 11 AAC 95.280(d)(2), the other slope stability standards are redundant with the BMPs that already in the regulations, and that from a scientific perspective there isn't a slope stability problem that isn't covered by the other BMPs.

Bob O. asked whether leaving low-value timber would conflict with silvicultural needs for reforestation – it might result in high-grading. Jim D. suggested that if the slope stability standards are applied, a landowner could request a variation if the standards would cause silvicultural problems. He also said that winter operations could be a reason for a site-specific exemption.

Mike D. asked about the role of slope stability standards on tributaries to non-anadromous streams, such as the tributaries to George Lake. The changes to the slope stability standards proposed as part of the Region I agency concurrence process would apply within 50' of tributaries to anadromous streams, but not to tributaries of high value resident fish streams. Bob O. asked where there is a biological reason for the 50' width on tributaries. Marty W. will check on the background. Steve C. said that in Region III many of the tributaries to fish streams are in non-forest areas. Fred Dean added that the Boreal Forest Council decided not to pursue a research project on non-point source pollution from forest operations in Region III because they couldn't identify significant impacts.

Bob O. said that sedimentation could occur if harvesting occurred on loose loess along tributaries. Chris M. said that little slope failure occurs, even where harvests are on permafrost, and the main challenge will be to ensure compliance with the existing best management practices. Steve J. noted that the new Quartz Lake Road built in the early 1990s didn't fail, even though it was constructed on frozen loess.

> **C18** Because of redundancy with other regulations (11 AAC 95.280(d)(1), (3),(4),(5)) and the buffers recommended for Region III, and because of the lack of known slope stability hazards on commercial forest land in Region III, there is not a scientific reason to keep the slope stability standards for Region III. Retention of low value-timber (11 AAC 95.180(d)(2)) isn't needed to protect slope stability on tributaries to anadromous and high value resident fish streams in Region III. There is not a difference between the need to protect anadromous and high value resident fish streams, or public and private lands, in Region III (i.e., if a decision is made to retain slope stability standards for Region III, they should apply consistently to both anadromous and high value resident fish streams.). High value resident fish populations are important for subsistence in the interior.

Winter roads.

Marty W. reviewed the existing winter road standards in the regulations (see handout).

Dave V. noted that replacing an organic mat removed during road construction would result in a low albedo and greater thaw depth that that under adjacent, intact vegetation. Bob O. said that the replaced materials still have insulative value. Chris M. noted that winter roads are usually in grass and sedge areas which regrow vigorously after disturbance. Bob O. reported on Tanana Chief's winter road studies. He concurred that the depth of the active layer increases under winter roads, but that the road surfaces have recovered with grass. They do not have data over a longer period to know whether the active layer will again become shallower. He noted that it is difficult to rehabilitate a vegetative mat if the road is used repeatedly. Steve C. concurred and added that the ability to re-cover a road depends on whether the road crosses unstable permafrost. He said that roots can become separated from the vegetative mat when the mat is cleared, and that reduces its insulative value. Steve J. stated that there is not enough snow in parts of the Interior to construct winter roads without removing stumps.

There was some discussion of whether thawing on winter roads leads to pooled surface water in the road. Jim D. said that some old road have turned into linear water features, but the impacts, for example water table changes in adjacent muskegs, are unknown. Bob O. noted that the road they are studying has not turned into open water after seven years of use. He also said the gully erosion can occur if the vegetative mat is bladed off a slope, or that standing water can develop on flat areas. Chris M. added that ORV travel unassociated with timber harvest had the biggest impact on the road surface by causing rutting. Bob O. also noted that summer ORV use often extends up to the edge of areas that cross open water. The committee noted that thermal erosion is usually a slower process than surface erosion.

Amy A. said that even in areas that are quite flat, sediment can travel. She said that in the Delta-Clearwater area sediment traveled across the highway when water from the hills caused flash flooding across agricultural lands. She also noted that there are warm seeps along road cuts near Tetlin.

Bob O. said that the important thing is ensuring that there is a mechanism for reviewing road locations prior to construction. Marty W. and Jim D. summarized the review processes – Detailed Plans of Operation (DPOs) for operations on private, municipal, and trust land are reviewed by DEC, ADF&G, and DNR prior to the start of operations, and conduct field inspections as needed. Proposed operations on state land are reviewed through the Forest Land Use Plan process and inspections as needed.

Chris M. said that ADF&G had raised concerns in the past about overflow icing on roads, but it isn't known whether the icing causes sedimentation problems.

> **C19** Use of water bars should be added to the list of practices used to prevent rutting, ground disturbance, or thermal erosion in 11 AAC 290(g)(1). If water starts to flow on the surface of a winter road, water bars can be effective at preventing erosion.

There was no conclusion on whether the standards restricting the removal of the vegetative mat for winter road construction should be strengthened. Chris M. noted that DNR Land Use Permits typically require retention of the organic mat. Marty will check on standard Land Use Permit stipulations before the next meeting.

Definition of lakes

Mike D. noted that the existing definition of "lake or pond" in the regulations (11 AAC 95.840 (40) requires that the water body have an inlet and outlet:

> "(40) **"lake or pond"** means a confined fresh water body with perennial water, defined shorelines, and an identifiable inlet and outlet".

He noted that many lakes important for sport fishing in the Interior don't qualify under this definition since they have no outlet. Notable examples include Dune, Harding, and Quartz lake. These lakes have important populations of stocked or indigenous fish and qualify as high value resident fish water bodies.

> **C20** The definition for lake or pond should be broadened to include waterbodies with high value resident fish populations as follows:
>
> **"lake or pond"** means a confined fresh water body with perennial standing water and a population of anadromous or high value resident fish."

Miscellaneous

Chris M. asked how the regulations address fords. Marty noted that they are covered by 11 AAC 95.305(b) which allows fords for equipment crossings during periods of low water. If the ford crosses anadromous waters, a Title 16 permit is required from ADF&G. Jim D. added that ADF&G frequently permits fords for occasional use.

Steve J. asked whether the regulations prohibit the cutting of stream banks for approaches to stream crossings. He said that because snow depths are often limited in the Delta area, that banks sometimes have to be trimmed – there is too little snow to build a ramp to the crossing. He added that in glacial systems bank cuts can refill by summer deposition of silt. Bob O. noted that 11 AAC 95.350 addresses bank integrity and discourages disturbance of bank vegetation and dead wood, and requires bank stabilization to prevent erosion and degradation of water quality. Jim D. said that ADF&G discourages bank cutting, and noted that cutting the banks increases the unregulated use of stream crossings. He will check with other ADF&G staff to find out whether their position on bank cutting is based on ACMP requirements for North Slope winter crossings.

Next meeting. The next meeting will be 8:30 Tuesday, June 22. This will be the last meeting until late fall. Marty W. and if he is available, Jim D. will brief the Board of Forestry on the process and draft recommendations at their meeting in Anchorage on July 28-29. The committee will recess through the summer field season, meet again in the fall to review the compiled package of recommendations and make any revisions needed based on new information from the summer field work or other sources. Assignments for the next meeting follow:

- **Bob Ott** will prepare a diagram of sun angles and shading).

- **Jim Reynolds** and **Dave V.** will check with Mark Oswood and Jacqueline LaPerriere on questions of transport of dissolved and particulate organic matter. **Bob Ott** will check with Mark Wipfli from the PNW station in southeast Alaska on the same issues.

- **Marty Welbourn** will check on the history of the 100'/50' widths in the slope stability standards and on definitions of LWD. **Marty** will also provide the committee with the new FRPA definition of "prudent" and check the existing regulations for references to "temporary" and "permanent" roads other than the culvert standards. **Marty** will provide the Committee with a copy of standard DNR land use permit stipulations for winter roads.

- **Jim Durst** will check with Coastal Management staff to determine whether ADF&G's prohibition on bank cutting for ice crossings is drawn from North Slope ACMP standards.

Agenda items for the next meeting include:

- Review of recommended buffer widths based on shading needs and sun angles.

- Review buffer width recommendations relative to sediment and organic matter transport.

- Conclusion of winter road discussion – is any change to the standards for disturbance of the vegetative mat recommended?

- Riparian management standards for ice crossings and the effect of freezedown on fish habitat.

- Additional issues on riparian management along glacial rivers. **Jim Durst** will check with ADF&G to see if there are additional issues in this category.

- Riparian management standards for upwelling areas.

- Review of stream classification system: can any classes be compressed based on similar management recommendations.

<u>Handouts</u>
Draft minutes from meeting #3
Draft chart of buffer recommendations
Draft key to stream classes
Existing FRPA regulations on winter roads
Existing and proposed slope stability standards
Airphoto of Teklanika River oxbows (from Mike Doxey)
Mason, Owen K. and James E. Beget, 1991. *Late Holocene Flood History of the Tanana River, Alaska, U.S.A.* Arctic and Alpine Research, Vol. 23, No. 4, pp. 392-03
Murphy, M.L., J. Heifetz, J.F. Thedinga, S.W. Johnson, and K.V. Koski, 1989. *Habitat utilization by juvenile Pacific salmon (Onchorhynchus) in the glacial Taku River, , southeast Alaska.* Canadian Journal of Fisheries and Aquatic Sciences. Vol. 46, No. 10, pp. 1677-1685.

Lorenz, J. Mitchel and John H. Eiler, 1989. *Spawning habitat and redd characteristics of sockeye salmon in the glacial Taku River, British Columbia and Alaska.* Transactions of the American Fisheries Society 118:495-502.

Murphy, M.L., K.V. Koski, J. Mitchel Lorenz, and John F. Thedinga, 1997. *Downstream migrations of juvenile Pacific salmon (Onchorhynchus spp.) in a glacial transboundary river*. Canadian Journal of Fisheries and Aquatic Sciences. 54:2837-2846.

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #5; June 22, 1999
DNR Large Conference Room, Fairbanks, AK

Attendance

Bob Burrows	Steve Joslin
Steve Clautice	Bob Ott
Mike Doxey	Jim Reynolds
Jim Durst	Dave Valentine
John Fox	Marty Welbourn

Visitors
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council
Jacqueline LaPerriere, Alaska Coop. Fish and Wildlife Res. Unit

Note: Points of consensus are shown with a **C.** Work commitments/assignments are shown in a box with the responsible person's name in **bold**. Handouts referenced in the minutes are available from either co-chair; some are quite lengthy.

MINUTES FROM MEETING #4

The committee reviewed, amended, and approved the minutes from the June 3, 1999, meeting.

PRESENTATION BY JACQUELINE LAPERRIERE

Jacqueline LaPerriere, Assistant Leader of the Alaska Cooperative Fish and Wildlife Research Unit, gave a presentation to the Committee about her research on hyporheic zones. She has expertise in lake and stream chemistry, stream nutrients, and the relationship of lake chemistry to global change.

She said that people used to believe that stream beds were impermeable below a shallow depth. However, research has shown that if there is unconsolidated material below a stream, there is a zone of water that flows along with the river (interflow) and above the groundwater – this is the hyporheic zone. Both the hyporheic and phreatic (true groundwater) zones contain living organisms, including specific species of insects. Water in the hyporheic zone interacts with surface flow in the stream channel. Water stays in the hyporheic zone for hours, as contrasted with water in the phreatic zone, which can reside there for upwards of hundreds of years. The size of the hyporheic zone is variable over time and along a stream, and is discontinuous in some areas. However the hyporheon can be quite wide – along the Flathead River (Montana), it extends more than 15 meters deep and as much as 3 km wide.

On the Tanana River bed, there are few living organisms, yet the fish in some places in the Tanana are full of aquatic insects. Some insects come from input from clearwater streams, but some also come from the hyporheic zone.

The hyporheic zone is a nitrification zone where compounds are oxidized from $NH4+ \Leftarrow NO2+ \Leftarrow NO3-$, the form of nitrogen used by plants.

In streams with high sediment loads, such as in some mining areas, the fine sediments can seal the bed and prevent flow between surface water and a hyporheic zone. In her studies, she was unable to install wells on glacial streams to determine how much of the glacial stream beds are sealed by silt. Bob B. noted that there are areas where groundwater levels are below the level of the Tanana River, which suggests that the channel bed is sealed in those areas. Many areas are probably not sealed. Silt isn't evenly deposited – river bars are places where the river dumps silt, while main channels often have a cobble substrate.

LaPerriere and Phyllis Weber-Scannell (ADF&G) conducted a preliminary study of the hyporheic area along the Tanana River. A series of wells placed previously by the USGS were pumped to study insects. Midges, collembola, and possibly caddis flies were identified that occur in the hyporheic zone. Blue-green algae that can live chemotropically (without photosynthesizing) were also found.

Dissolved oxygen (DO) saturation in the hyporheic zone is commonly about 30%. In the sampled wells near the Tanana and Chena rivers, DO levels were about 7% (1 ppm) and temperatures were about 0 degrees Celsius. The conclusion is that the sampled wells were primarily influenced by groundwater.

Water in the hyporheic zone is clear. It mixes with groundwater as well as surface water in channel flow. Wells that rise and fall along with stream flows are in the hyporheic zone, not the true groundwater zone. Bob Burrows noted that DO in upwellings in glacial rivers is from water from the hyporheic zone rather than true groundwater. Jacqueline agreed that the areas where groundwater first emerges are probably not the spawning areas.

Insects actively enter the hyporheic zone in times of drought or flood, or in response to chemical changes in the surface water. These insects must return to the open channel and air to reproduce.

This concluded Jacqueline's presentation. An open discussion with her followed.

Jim Reynolds said that inorganic and organic sediments are transported largely in surface water during spring breakup. He asked whether there could be much transport in the hyporheic zone at some seasons. LaPerriere said that the only carbon transport research is from the Caribou-Poker Creeks watershed. She added that input of organics from surface runoff directly into streamflow is more likely than infiltration from surface water to groundwater to the hyporheic zone. She noted the example of residential development on Borough land near Harding Lake where runoff from hillside parcels caused enough erosion to form a new delta in the lake. She also said that septic tanks and lawn chemicals are problems around lakes and that there should be buffer strips for those activities near lakes.

Jim R. noted that insect emergences that he has observed along the Tanana River have been localized and associated with LWD, not from the general river waters. However, areas without

LWD must also have emergences since not all aquatic insects use wood as a substrate. Jacqueline added that these emergences are short (a few hours) and may not be a major food source for fish. However adult insects die after reproduction and may be a source of fish food. Emergence can also occur through permeable gravels in near-shore areas.

Jim R. said the DO decreases under sealed ice cover on streams. He asked whether more respiration per unit volume occurs as you go downstream. LaPerriere said that this is likely since more organic compounds are entering from tributaries as you go downstream so that biological oxygen demand increases. Jim R. asked how buffers might change the ratio of production:respiration. Bob B. responded that groundwater input also increases the chemical oxygen demand (e.g., from iron and manganese compounds that oxidize readily). The increase demand on DO can be chemical rather than biological. Deposits of iron oxides near groundwater (phreatic) sources are evidence of this occurrence.

UPDATES

- Marty confirmed that DNR and ADF&G did receive funding for Forest Practices implementation, and for the first phase of continued Tanana Fish Habitat studies (40.0 to ADF&G), and for the first phase of Tanana River Dynamics research (66.0 to DNR).
- Marty distributed copies of the draft amendments to the Forest Practices regulations for Region I. The draft amendments are out for public review until July 23.
- Marty noted that the Tanana State Forest Management Plan update is proceeding. A draft will likely be distributed for public review in August.

DESIGNING BUFFERS FOR SHADING

The group continued discussions from June 3, 1999 meeting on the buffer width necessary to provide shade along stream types sensitive to warming and oxygen depletion.

John F. said that buffers are designed to address the worst-case scenario in terms of the highest heat load, which carries the highest risk of increased temperatures. This occurs when the sun is at its maximum angle (approx. 113° minus latitude at solar noon on the summer solstice). Bob O. added that at the summer solstice, using an average tree height of 70', the buffer width for these conditions would be 62' – trees farther from the bank would not contribute to stream shading at this time. At the fall equinox with 70' trees, the distance that would contribute shade is 150' because of lower sun angles, but there isn't solar loading to overheat a stream at that season. Mike D. and Jim R. said that the maximum water temperatures in Region III occur from approximately mid-June to mid-July, especially if it is cool and rainy later in the summer.

Bob O. noted that trees don't always grow right to the bank along Region III streams. Jim R. responded that the buffer should still start from the bank rather than from the edge of forest cover – a wider buffer wouldn't provide additional shade. You are protecting the type of stream you have under natural conditions. Open areas should stay open – for example willow-alder cover is important to fish habitat productivity. Measuring from the ordinary high water mark (OHWM) is a good working definition. Bob B. added that OHWM is usable in the field. John F. also

noted that the shade contribution of trees that are back from the stream bank is less than from those near the bank. The banks themselves also provide shade.

Steve Joslin said that the average tree height of white spruce in harvest areas is about 74', but may be 85' along stream banks. He said 80' would be an average height of commercial stands; 70' is closer to the average height over all stands. Steve C. noted that the narrow tops of spruce trees provide little shade. He added that 70' is typically the upper end of tree height for most hardwoods, but that some could reach 75'. Bob O. said that some balsam poplar could exceed 75', but not many.

Dave V. asked whether narrow buffers are windfirm. Bob O. said that windfirmness isn't a big problem in most of Region III except near Delta. For example, large trees left in shelterwood cuts at Willow Island remained windfirm. The larger trees left in thinning plots did blow over. Most wind damage occurs within the first 10 years after thinning. Jim D. said that in contrast studies in SE Alaska found that trees didn't get windfirm after pre-commercial thinning. Bob O. said that even in studies in the Pacific Northwest and SE Alaska, stands become windfirm in 10-15 years. John F. added that white spruce responds well to release over a wide range of ages. Steve J. said that most mortality occurs in the first 1-2 years after adjacent harvesting. Big trees left for seed trees on the periphery of harvest units in the Delta area have usually been windfirm. Big trees left in the center of harvest units have been more susceptible to windthrow.

John F. said that a difference of 10' more or less from the suggested 66' buffer width would not have significant impacts on stream characteristics. The increment of shade provided would have questionable biological significance. Bob O. noted that the buffer distances are measured for when the sun is perpendicular to the stream course; when the sun comes from angles different than 90°, there is effectively a wider buffer. It's beneficial to have a simple, single buffer width standard for field implementation. John F. concurred.

Jim D. said that ADF&G takes a conservative approach to fish habitat protection; therefore they would recommend a 75' buffer for backwater sloughs based on tree heights that may exceed 70' and susceptibility to warming in this water body type. Bob O. said that a wider buffer would also mitigate impacts if a stream migrates and erodes into the buffer. However, he noted that the clearwater and backwater stream types probably have relatively stable channels. Jim R. said that if there is a place where a different standard is justified it is on the backwater sloughs – these are prime nursery areas for salmonids and are resident fish habitat. Shade provides darkened cover for fish as well as temperature control. If the buffer is approximately equal to the tree height, you have a chance to capture all the potential LWD. Caution is good here, especially if the stream moves.

Steve J. noted that backwater sloughs are stable. Jim R. agreed that this is true on a 50-year time scale, but not necessarily over a 100-200 period. Bob O. said that 66' is adequate for LWD using either a 70' or 80' tree height, since 95% of the LWD in southeast studies comes from within 2/3 of the tree height. [Editor's Note: When discussing LWD, it is important to remember that there are differing definitions of what qualifies as LWD and that some definitions have temporal or spatial components. For example, some studies have considered only LWD recruited from sources immediately adjacent to the stream, and not upstream sources or downstream sinks.]

Marty W. added that when trees are farther away, that even if they fall perpendicular to the stream, the portion of the tree overhanging the stream bank is too small in diameter to function as LWD. Bob B. said that 66' is easily explained based on maximum tree height and supply of LWD. He also noted that trees usually encroach on backwater sloughs over time.

C11, amended For water body types I.B. and II.C. (glacial and non-glacial backwater sloughs), a minimum 66' no-cut buffer is needed to provide large woody debris and shade. To avoid reducing natural shading, the width should be increased as needed based on stand height, vegetative composition, and susceptibility to windthrow. Natural shade conditions vary based on tree height, tree species and understory vegetation, and bank geometry.

C21 Stream buffers should be measured from the ordinary high water mark (OHWM) regardless of the vegetative cover type within the buffer zone.

C22 [For notes column on summary chart to accompany **C11**.] Shading is a function of tree height, sun angle, and latitude. At latitude 65° N (the latitude of Fairbanks), the following shade distances occur:

	Shading distance by date	
Average Tree height	June 21 (max. sun angle)	July 18 (warmest stream temp. in Interior)
70 feet	62 feet	67 feet
80 feet	72 feet	77 feet.

DESIGNING BUFFERS FOR CONTROL OF SEDIMENTATION AND DOM TRANSPORT

Dave V. reported that Region III has a lot of loess deposits that gully easily and are prone to erosion. John F. looked at a road at an old (pre-FRPA) timber harvest on 17-mile Hill in the Nenana Ridge area. He traced the sediment trail from the road for 400 meters across a moss-covered area into a small stream. The area eroded down gullies through black spruce cover on a gentle slope. The natural buffering capacity of ground cover can be exceeded in such cases. His study started in 1976 and was on an area harvested in the early 1970s. He reported that it was a terrible logging job and that the operator was sued by the state for poor utilization. Dave V. reiterated that if you harvest poorly, there are consequences.

Bob O. noted that these issues are now addressed by the road standards in the FRPA and its regulations. The question is whether there would be sedimentation from harvests adjacent to a riparian area. Road-building standards are a bigger concern that riparian management. Jim D. said that a buffer can help filter sediments from either roads or harvest areas.

Steve C. concurred that sediment from a large point source can travel hundreds of meters through woods, but that he hasn't seen erosion from logged areas. The biggest risks are from ground-

based cable skidding. Large scale operators in hardwoods would more likely use equipment that is less disruptive to ground cover such as feller-bunchers or grapple skidders. John noted that Region III has hill and valley landforms, and that skidding logs down low points creates the greatest sedimentation risk.

Marty reviewed the FRPA Regulations for road building that address erosion and sediment concerns.

Dave V. asked about potential impacts from whole-tree harvesting where even stumps are removed. Steve C. responded that most of the soil exposure comes from site preparation activities. Bob O. also noted that little harvesting occurs on erodible soils on slopes adjacent to riparian areas. Bob B. said that where trees were cut and the roots removed on river banks with permafrost during construction of the TAPS pipeline, bank sloughing and erosion greatly increased. He noted that black spruce is not the only timber type over permafrost, and that white spruce and balsam poplar stands can occur on permafrost.

Bob O. said that he talked with Rick Woodsmith and Di [Adelaide] Johnson from the USFS Pacific Northwest Research Station in Juneau, and another researcher in Oregon, about sedimentation concerns. He said that even in the Pacific Northwest, they are more concerned about mass wasting than sheet wash.

Dave V. summarized a paper by John F. that suggested that harvesting could increase saturation in surface soils. When saturated soils freeze they might form an impermeable layer that could lead to more surface runoff during spring melting. Harvesting can decrease transpiration which increases soil moisture; if soils are saturated at freeze-up, an impermeable frozen layer might form. John said that soil moisture at freeze-up might be more important than snow pack in determining runoff during breakup. Bob B. said that the key impact on runoff is the temperature cycle in the spring.

Several committee members said that impacts from harvesting depend on the type of practice, e.g., whether only the boles are removed and the whole tree is taken with the stump.

Bob O. said that there is no information specific to the width needed for controlling sedimentation. Steve C. said that little comes off harvest areas but big point sources can travel long distances. John F. noted that if an erosion problem isn't addressed, it continues to worsen. Inside ditches on roads can become gullies.

Jim R. said that it sounds like there is not much need for concern about movement of dissolved organic matter (DOM). He asked LaPerriere whether anything harvesting does would increase DOM (i.e., nutrients or leachate) to the stream. Based on her talk, there may not be significantly more DOM or nutrients produced – there does not appear to be a scenario for increases to occur. Harvesting can lead to increased primary productivity, but that does not necessarily lead to more DOM in the stream. She responded that it would depend on the new temperature regime and the new ground cover that developed. There is a great need for research on Interior stream systems to answer such questions. Most of the organic matter from a stream basin that enters a stream would come from surface runoff rather than interflow in the hyporheic zone.

Bob B. noted that evapotranspiration in Interior Alaska keeps conditions so dry that there is little infiltration to groundwater. In this area, evapotranspiration approximately equals precipitation and may reduce runoff. John F. added that this also decreases the risk of subsoil transport, particularly on south-facing uplands. In black spruce flats, much transport is over the frozen mineral soil but under the moss layer. Dave V. said that in two Caribou Creek watersheds, studies showed that most carbon in permafrost areas came through organic mat, whereas on soils without permafrost most carbon was inorganic.

Bob B. said that clearing stream banks in permafrost areas might increase freeze-down of the thaw bulb, reducing the size of the hyporheic conduit. By cutting down to the bank in a place with intermittent upwelling flows, it would be possible to increase freezedown enough to restrict upwelling at that point.

C23 There is little evidence that current harvesting practices will significantly increase dissolved organic matter in water bodies in Region III.

C24 Information is inadequate to provide specific recommendations for buffer design to control introduction of sediments into water bodies from steep slopes adjacent to water bodies.

C25 Little sedimentation is likely from harvest areas due to low precipitation levels and little exposed mineral soil under typical harvest practices. However, where a large point source of sediment is created, sediment can travel significant distances (several hundred meters) even over undisturbed ground cover. Such sources are most commonly associated with roads rather than harvest areas.

WINTER ROAD STANDARDS

The Committee continued the discussion on winter road standards from the June 3 meeting.

Marty W. distributed standards stipulations from the DNR Division of Land for winter travel on the North Slope. The Division of Land select applicable stipulations from this list for winter travel permits in Interior Alaska. Bob O. noted that some of the North Slope stipulations don't make sense for the Interior.

Jim D. reported that ADF&G's prohibition on bank cutting for approaches to winter stream crossings is regionwide rather than an ACMP stipulation, and that exemptions are made on a site-specific basis.

Dave V. asked how well grass regrows on winter road routes. Bob O. responded that it regrows well, and added that if a winter road is reused over a number of years it doesn't make sense to revegetate during the period of use. Steve C. added that the Division of Forestry does reclamation on fire lines more for aesthetics than erosion control. He also noted that seeding a winter road bed doesn't work if immediate cover is needed for erosion control.

Steve J. said that blocking summer access is difficult unless the winter road is designed so that an area of open water blocks access.

The Committee recommended no additional changes to the regulations for winter roads.

ICE CROSSINGS

Mike D. clarified that ice crossings are not limited to glacial stream types.

Steve J. said that ice crossings may either use natural ice conditions or that operators may build up the ice thickness. Operators want at least 30" of ice on crossings, and prefer at least 40". They often pump water onto the ice surface in small increments and let it freeze to augment the natural ice. Bob B. added that the Army Corps also pumps water and lets it freeze to provide a crossing surface for heavy equipment. John F. noted that removing snow can increase ice thickness, but that the R value of the ice cover also increases as it thickens. Steve C. said that artificially thickening the ice may change the timing of freezing more that the eventual ice thickness over the course of the winter – it allows operators to use the crossing earlier. For example, adding 10" of ice can be relatively easy, and allow operations to begin in November rather than February.

Bob B. said that CRREL *(Cold Regions Research and Engineering Laboratory)* has studied the structural aspects of ice crossings, but probably not their effect on fish habitat. He suggested contacting Charlie Collins (353-5150). He noted that one CRREL study showed that erosion from bank slumping was greater where ice revetments were created.

Steve J. said that the military has overbuilt some ice bridges and created upstream turbulence which eroded the natural ice adjacent to the bridge and caused the bridge to collapse in the center of the channel

Mike D. and Jim D. said that the Division of Land stipulations for North Slope winter travel may not be applicable in the Interior. On the North Slope, riffles freeze and deep holes don't so that fish winter in the holes. In the Interior you don't want to interrupt intergravel flow where eggs are incubating, but also do not want to freezedown pools where fish may be overwintering.

Steve J. distributed a report and photos he prepared on ice thickness in the middle Tanana in the Surprise Side area. He said that the ice crossing for the Providence timber sale is the one place that DOF has used an ice crossing in a known spawning area. The crossing used the natural ice thickness.

Mike D. noted that there are variable conditions of stream flow going into freezeup. He asked whether the ice depths that Steve J. recorded are typical over this range of conditions and over a variety of areas. Steve J. said that the ice thicknesses he recorded would not be applicable to clearwater streams.

Bob B. said that ice thickness increases over winter from aufeis. Ice formation in the channel decreases the area for stream flow and produces a stage rise (rather than an increase in flow). The stream may erode the channel bottom to allow continued flow under thick ice rather than erode the underside of the ice. A stream will recover the area it needs to carry the volume of flow over the existing gradient. Flow may double before the ice goes out.

Richard McCaffrey noted that on the Surprise Side slough bridged ice thinned over the upwelling due to melting from below over the warm groundwater. The ice over the upwelling collapsed. Steve J. added that trucks can't drive on ice bridged over air (i.e., not in contact with the water underneath) – the ice isn't strong enough.

Bob B. said that there is a thaw bulb under streams (the hyporheic zone) that could decrease if the surface water freezes solid. If there is no flow, then stream gravels, including redds, might freeze. Freeze over might also occur if a constructed ice bridge collapses on a channel with redds. Jim R. said that degradation of redds from increased scouring that accompanies stage increases may be a more serious impact than the effects of freezedown into gravels. The issue is what the added impact is from human activity.

Dave V. said that an ice bridge constructed on a low-flow slough might cause freezedown. An ice bridge on main channels could increase scouring. Bob B. suggested that in shallow areas you might allow crossings on natural ice, but not allow artificial thickening of the ice.

Steve J. stated that an operator can't start adding thickness to the ice until after the maximum stream height has been reached. Operators usually start with a couple of feet of natural ice before starting ice bridge construction. On Providence Slough, the Tanana River water is augmented by groundwater. In most spawning areas along the Tanana the channel typically doesn't freeze sufficiently for an ice crossing because the warm groundwater needed for spawning doesn't allow enough freezing. At Providence, enough river water is mixed with the groundwater to allow sufficient natural freezing.

Bob B. reported that the winter Tanana River flow at Tanacross is about 2500-2800 cfs. The groundwater flow from the Delta-Clearwater is about 700-800 cfs so that groundwater would be about 20% of the total winter flow in the Tanana downstream from the Delta-Clearwater confluence. He added that you won't build a road across a groundwater spring because it won't freeze enough. If the channel is constricted, it must increase flow speed or find additional area for flow through erosion or by pushing the ice cover up. Freezing occurs both at the top and bottom of ice layers. Bob B. suggested that operators not be allowed to enhance ice thickness in known spawning and other important areas due to the risk of bed scour.

Bob O. said that some operators build bridges by just compacting the snow cover to decrease insulation and increase freezing. Bob B. said that channel constriction would occur naturally during winters when the ice is especially thick. Steve J. reiterated that augmenting natural ice has more impact on the timing of freezing that the eventual ice thickness – it accelerates the freezing. He also noted that Tanana River ice contains silt and may be weaker per unit thickness that purer ice.

Fred Dean asked whether the agencies can identify areas where spawning is not occurring and identify those areas as crossing zones. Steve J. said that spawning spots move around a lot. Mike D. said there may be areas where no spawning areas have been found in the 15 years that Louis Barton has collected data on fall spawning. Steve C. asked whether the fall spawning detection flights could be used to identify areas where spawning is not occurring that could be used for that winter's crossings. Richard M. asked whether late-freezing areas could be mapped in the fall to have the best information for that winter. A question was raised whether ice crossings planned for this winter could be instrumented to look at some of the impact questions.

Jim D. asked how options for channel change affect scour rates in braided channels.
The committee said that more information is needed on ice crossings and agreed on the following points at this time.

C26 For large streams with significant flow (both glacial and non-glacial?)

1) Within glacial waters (class I.A.), salmon spawning areas are typically associated with groundwater upwellings that maintain warmer water temperatures. Water temperature close to groundwater upwellings is typically too warm to allow sufficient ice to develop to support crossings for forest roads.

2) In cases where ice crossings are feasible in spawning areas, operators should not be allowed to augment natural ice thickness. Ice crossings may be allowed in these areas where the natural ice thickness is sufficient to support travel and the natural ice thickness is not augmented. [Note: additional ice might be allowable depending on the water depth under the ice. E.g., It may be reasonable to augment 30" of natural ice over 10' of water, but not directly over gravel.]

3) There are no data to indicate whether or not augmenting natural ice thickness will cause freezing into spawning gravels or overwintering habitat for fish and adversely impact spawning or overwintering habitat.

4) Bed scouring may occur under ice cover due to channel constriction as ice develops. There are no data to indicate whether or not augmented ice thickness for ice crossings at or near spawning or overwintering areas will increase scouring that could adversely affect spawning habitat.

5) Egg incubation can occur in gravels under channels that have no surface water during some seasons on some sites (for example, along the Toklat River and at the mouth of the Delta River). Compression or shock from travel on these sites may adversely impact incubating fish.

NEXT STEPS

The Committee will recess for the summer field season. We will reconvene the committee in late fall after summer data have been reviewed to finish discussion of remaining questions and complete an overview of the consensus points developed.

The co-chairs will distribute the draft minutes of this meeting (June 22) by e-mail and the committee will e-mail comments back to the co-chairs so that final minutes can be distributed to the Board of Forestry before the July meeting.

Remaining issues include:

- Appropriate standards for ice crossings on other stream types (smaller streams).
- What other existing information can be compiled on ice crossing issues? Ideas include:
  - Theoretical maximum ice thickness based on freezing degree-days in Region III.
  - Records of observed maximum ice thicknesses, e.g., from library records.
  - CRREL data on impacts of ice bridging.
- Research priorities for ice crossings.
- Can any of the water body classes be combined to simplify the classification system based on similar management recommendations.

Marty W. will brief the Board of Forestry on the Committee's work when the Board meets in Anchorage on July 28-29. The briefing on the Region III work is tentatively scheduled for 10:45 Wednesday, July 28. The meeting will be teleconferenced to the DNR conference room and all Committee members are cordially invited to attend. A draft agenda for the Board meeting is attached. If you are interested in attending, call Marty W. to check on any last-minute agenda changes. The co-chairs will provide the Board with copies of the Region III committee's meeting minutes, the impact matrix, the classification key, and the consensus points for buffers and other issues.

THANKS!

The co-chairs want to thank all the committee members for their participation in these meetings, and their help compiling information between meetings. It has been a pleasure to work with the whole group, and we look forward to working with you again in the fall.

<u>Handouts</u>
Agenda
Minutes #4 - draft
Buffer chart – revised draft
Non-buffer consensus chart – draft
Region III Key to Stream classes
Public review draft of proposed changes to FRPA Region I regulations
Existing permanent/temporary road regulations
Div. of Land standard stipulations for winter travel on the North Slope
Tanana River Ice Formation Study – Surprise Side Timber Sale (Joslin)
Diagram of shade effects from riparian buffers (Fox)

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #6; November 30, 1999
DNR Large Conference Room, Fairbanks, AK

Attendance

Steve Clautice	Bob Ott
Mike Doxey	Deanne Pinney
Jim Durst	Jim Reynolds
Jim Ferguson	Marty Welbourn
John Fox	Amy Ash
Torre Jorgenson	

Visitors
Marc Lee, DNR Fairbanks Area Forester
Gordon Worum, DNR DOF Cartographer
Chris Stark, Tanana Valley State Forest Citizens Advisory Committee

Note: Points of consensus are shown with a **C.** Work commitments/assignments are listed at the end. Handouts referenced in the minutes are available from either co-chair; some are quite lengthy.

MINUTES FROM MEETING #5

The committee reviewed, amended, and approved the minutes from the June 22, 1999, meeting.

BOARD OF FORESTRY UPDATE

Jim D. briefed the Board of Forestry on October 27,1999. He updated the Board on the Committee's work, and showed slides of stream classes (thanks to Mike D., Chris Maisch, and Bob O. for help collecting slides). In summarizing the Committee's work, Jim D. said that the group has done a good job of compiling existing information based on the members' collective experience and knowledge. Some research is underway to help fill in gaps. A literature review is still needed on key topics. He reported that the Board and public were supportive of the Committee's work, and look forward to the results.

Jim R. noted that the Committee has used some information from research in Region I, where appropriate based on local expertise. He asked whether the Board expects that that there will be a high degree of transferability of Region I results to Region III, and whether that might lead the Board to push for Committee results too quickly? He also noted that there are differences between the regions, such as overwintering regimes and the role of groundwater. Bob O. said that the Committee should use information that seems applicable; if research from other areas doesn't apply in Region III, we should exclude it or modify it and explain why. Marty W. concurred that the Committee should be aware of information from other areas, but should recognize ecosystem differences. She noted that the Board has broadened its statewide perspective in the last couple of years, and has begun to view literature needs more strictly.

PERSONNEL UPDATE

- Chris Maisch is the new Regional Forester for the DNR Division of Forestry.
- Bob Ott will be the TCC representative to the Committee.
- Nick Hughes from UAF has joined the Committee, filling the vacancy left by Mark Oswood's retirement to Wenatchee. Nick brings expertise with juvenile salmonids and grayling; and has done research in Interior Alaska, New Zealand, and British Columbia.
- Jim Ferguson has moved from DEC to the ADF&G Habitat & Restoration Division where he is the statewide coordinator for Forest Practices and Coastal Zone Management. He will become the ADF&G co-chair for the Committee.
- Jim Durst will remain a member of the Committee, focusing more on technical aspects rather than Committee administration.
- Eric Decker is the acting lead for Forest Practices at DEC. Amy will continue to represent DEC on the Committee, but doesn't do Forest Practices fieldwork anymore.

RESEARCH UPDATES

Tanana River Dynamics. Marc Lee and Gordon Worum provided an update on the Tanana River Dynamics project funded by Section 319 money. The Division of Forestry and Tanana Chiefs are compiling the imagery needed. They are fusing LANDSAT 7 coverage with 30-meter resolution with black-and-white IRS satellite imagery with 5-meter resolution. They have12 scenes cloud-free so far and are requesting additional cloud-free coverage. The fused imagery will provide a colorized version which gives more detailed information than the black-and-white data. The project will match current information from the satellite images with old photos. Photos have been purchased and scanned and are being rectified to get needed accuracy (within 15 m; usually within 5 m). Some photos are missing fiducial marks. Digital Elevation Models can't correct distortion on non-fiducial photos – they must be rectified using known points, sometimes as many as 60/photo. The project is compiling information within a band one-mile wide on either side of the Tanana River from Kantishna to Tok. Vegetation typing within this area is also being improved. Marc noted that DOF is putting in ample staff time to meet requirements for matching funds. The report is due by the end of June. The project is close to targets for interim tasks.

Tanana River Fish Study. Jim D. handed out a copy of the FY 2000 1st quarter progress report for ADF&G Tanana R. fish study. Two sampling periods were conducted in the summer of 1999 – 5 days in August and 8 days in September. August water levels were high – sites below Delta couldn't be sampled. The Tanana River was about ½-mile wide by Shaw Creek, with most of the braided channels flooded/interconnected. September water levels were low, but ADF&G got to most of the sampling sites. September samples showed a large increase in use of the main stem by grayling over August; seining of gravel and silt sites found 200-300mm grayling. This is consistent with previous studies that show movement to overwintering sites by fall. Chinook and coho juveniles were found in the mouths of the Delta-Clearwater and Goodpaster rivers in August, but were essentially absent from these sites in September. The next sample period is planned for May. Chris Stark asked whether there are data on the fall movement upstream? Jim

D. responded that people have seen the juveniles upstream in the past, and that there is information from informal sources like trapper's reports and from formal studies.

Research needs. The Committee discussed research needs. Two high priority topics are ice crossings and the role of large woody debris in glacial rivers. Amy A. noted that DOT and CRREL have engineering data on load-bearing capacity for varying ice thicknesses.

Large woody debris (LWD). Jim D. expressed interest in getting data on wood budgets, LWD movement, and residence time of LWD in glacial rivers. He suggested that one way to gain information would be by radio tagging LWD before spring breakup, and then aerially tracking the tags during breakup and summer high flows. Bob O. said that LWD also needs to be dated, and noted that he found one stump in the river was from a tree that died 750 years ago. Wood gets buried and reexposed, not just flushed downstream. Collecting information on LWD isn't a short-term project. Tree ring analysis could provide good dates if the tree is sound and if you assume that the tree died when it went into the river. John F. noted that dates must be tied to an existing tree ring chronology, which may not exist for riparian areas. He reported that a test at Harding L. did not show a systematic correlation with wet and dry seasons in riparian areas because there is ample moisture.

Bob O. said that there is very little data on LWD in interior streams. He added that these issues haven't been addressed here; we just assume it is important. Steve C. said that there is less data for the Tanana than for other stream types that would be similar to streams in other regions, for example, the Chena. Torre J. asked whether ADF&G incorporated LWD in their Tanana Fish study surveys. Jim D. responded that they selected areas for seining that don't have LWD to ensure workability with the seines. Minnow traps sample LWD areas fairly heavily. There are a lot of microsite influences around LWD, e.g., slow flows. Jim F. noted that there are studies on 3 or 4 glacial systems in SE Alaska; he will provide copies to the Committee. Jim R. said that methods or protocols from SE might be helpful for Interior studies.

Jim D. suggested that it would be interesting to do an underwater video in winter near LWD to see if the areas are being used. Jim R. added that an underwater camera might be available for University of Alaska work from joint studies they have done with the National Park Service, and that Nick Hughes also has a camera. Bob O. said that a camera could be used to check LWD use in clearwater systems, too.

Jim R. reported that he had looked at grayling in winter in the Chena River drainage. Studies usually seek open areas away from LWD to get adequate lighting. ADF&G does some electroshocking fish studies as well. These studies usually avoid LWD for safety when using shocker boats, but it's possible to conduct shocking near LWD.

Torre J. said that the lack of data on LWD seems like a fundamental gap in knowledge of interior systems. Jim R. stated that we need information on the role of LWD in these rivers before we focus on recruitment of LWD. He noted that we have data on LWD use as habitat in clearwater streams like Chena, and need to focus on glacial systems. [Note: following the November 30 meeting, Jim R. provided an update and stated that "there is essentially no information on the ecological role of LWD in arctic or subarctic streams, glacial or clearwater. See comments

under the literature review for LWD in the minutes for Meeting #7.] Glacial stream information in RIII is observational, it is not from full studies. Mike D. concurred, and added that the Committee has already recommended buffers for nonglacial streams. Bob O. added that we need to document existing efforts to date with references, particularly buffer strip designs.

Jim D. noted that Committee backing adds weight to research fund requests.

Literature review. The committee agreed that literature review is needed on several topics. Members volunteered to compile annotated reference lists and highlight key references or syntheses on the following items.

Large woody debris. Information on the role of LWD in Region III is a high priority. It's important to document existing studies on LWD in both glacial and non-glacial Region III streams. **Jim Durst** and **Jim Reynolds** agreed to tackle this topic. Bob O. has already provided some references on this topic, and Jim D. will annotate them.

Permafrost and silty soils. The second topic is the effect of permafrost and silty soils on sedimentation following disturbance. **Deanne P.** volunteered to coordinate this topic with help from Torre J. Amy A. suggested checking NRCS sources. Bob O. has copies of some references from TCC's winter road study. Torre and Steve C. emphasized that this topic needs to be focused on forest management practices or forest access, and to recognize existing BMPs.

Ice bridges**. Bob O.** and **John F.** will compile the information they have on ice bridges, with help from **Steve C.** on CRREL data on natural ice formation.

Buffer strip design. **Jim F.** will provide information from Southeast Alaska on this topic in coordination with Jim Durst. Bob O. has already provided some references (see handout list).

Bank stability. Jim D. noted that he hasn't seen as much evidence of ice bank scouring on Tanana River as on Susitna River. Steve C. added that there is more scouring on the Yukon River. Chris S. said that the committee should document whether or not vegetation is controlling bank erosion on glacial stream banks. Bob O. said that the Tanana River Dynamics project is looking at the effect of permafrost and vegetation type on bank stability. He also said that data from CRREL so far is mixed. *[This was not assigned as a separate literature review topic.]*

Upwellings. Torre J. stated that we need to summarize information on groundwater upwellings that is available from the USFWS, USFS Forest Sciences Lab, and others. *[This was not assigned to anyone.]*

Additional items. Chris S. said that the committee should document winter use of fish in glacial streams (i.e., when they clear up), and the role of vegetation on erosion of glacial stream banks. *[These were not assigned to anyone.]*

NEXT MEETING: 8:30, Thursday, January 13 at DNR Large Conference Room

HANDOUTS

Maser, Chris and James R. Sedell, From the Forest to the Sea – The Ecology of Wood in Streams, Rivers, Estuaries, and Oceans

O'Laughlin, Jay and George H. Belt. 1995. Functional Approaches to Riparian Buffer Strip Design. J. For. 93(3).

Bragg, Don C. and Jeffrey L. Kershner. 1999. Coarse Woody Debris in Riparian Zones. J.For. 97(4).

Steinblums, Ivars J., Henry A. Froelich, and Joseph K. Lyons. 1984. Designing Stable Buffer Strips for Stream Protection. J. For. 82(1).

Fetherston, Kevin L., Robert J. Naiman, and Robert E. Bilby. 1995. Large woody debris, physical process, and riparian forest development in montane river networks of the Pacific Northwest. Geomorphology 13:133-144.

Bren, L.J. 1993. Riparian zone, stream, and floodplain issues: a review. J. Hydrology 150:277-299.

Martin, Douglas J., Morgan E. Robinson, and Richard A. Grotefendt. 1998. The effectiveness of riparian buffer zones for protection of salmonid habitat in Alaska Coastal Stream.

TO DO:

Revise contact list – get new numbers from Hughes, Ferguson, my fax
Work with Jim D. to develop a library of references handed out

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #7; January 13, 2000
ADF&G Large Conference Room, Fairbanks, AK

Attendance

Steve Clautice	Steve Joslin
Mike Doxey	Chris Maisch
Jim Durst	Bob Ott
Jim Ferguson	Nick Hughes
Marty Welbourn	John Fox
Dave Valentine	

Visitors
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council

Note: Points of consensus are shown with a **C.** Work commitments/assignments are listed at the end, under "To Do". Handouts referenced in the minutes are available from either co-chair.

MINUTES FROM MEETING #6

The committee reviewed, amended, and approved the minutes from the November 30, 1999)meeting.

ANNOUNCEMENTS

Chris M. announced a conference in Portland in October, 2000 on large woody debris in large rivers, and noted that the Division of Forestry and Tanana Chiefs would prepare a poster on the Tanana River Dynamics project for the conference.

Jim F. announced a workshop in Juneau January 31-February 1, 2000 on large woody debris in southeast streams.

Nick Hughes introduced himself. Nick is a fish ecologist and has worked in Interior Alaska since 1984. His studies include work on clearwater tributaries to the Tanana River, habitat use by fish in the mainstem of the Tanana, and overwintering in Interior Alaska. He has also worked in British Columbia and New Zealand. Nick is currently on the faculty of the UAF School of Fisheries where he teaches fish ecology.

RESEARCH UPDATES

Tanana upwellings. Richard McCaffrey reported on the Alaska Boreal Forest Council's study on Tanana River upwellings. An early fall survey has been added to the study, with aerial photos taken on October 11, 1999. This survey covers the maximum time of fall chum salmon spawning, and a period when river discharge remains high. The early fall survey covers the same area as the spring and late fall surveys (from the Little Delta to Delta R. confluence) and

extends upstream past Bluff Cabin Slough to the Delta-Clearwater area. Much of the open water in the study area is a plume from the Delta-Clearwater, and the Delta-Clearwater is important for salmon spawning. The photos for the late fall survey were flown at the end of November, 1999 at the time of ice formation.

Richard reported that he had identified roughly 30 sites of interest from the early fall photos. The photos show some clearwater mixing on the north shore of the Tanana River at the base of small side streams. These sites were not visible in the spring photos, and we do not know whether they are spawning sites. In response to a question, Richard clarified that it is uncertain whether the north shore sites are upwellings or areas where surface water from side streams mixes with the Tanana. The streams are not obviously connected to the Tanana, but there could be culverts or intergravel flow.

On the south shore of the Tanana and mid-channel, about five sites show red stream bottoms from deoxygenated groundwater coming to the surface. The color could be from iron oxides or sulfur bacteria. Richard noted that not all upwellings are suitable for spawning – water quality is a factor in suitability. Some upwellings are evident on the islands in the Tanana, although most occur on the north or south river banks. Jim D. added that ADF&G staff noticed one island upwelling during their fish surveys as well.

Steve C. asked whether mixing plumes could be distinguished from upwellings on the photos. Richard replied that it would be difficult to distinguish upwellings, mixing zones, and settling zones. Bob O. said that spectral analysis of satellite imagery might be able to identify sites. Dave V. added that settling zones might have different spectral signatures than mixing zones because of different sizes of suspended particles. Richard later noted that the images acquired in the ABFC study are photos rather than satellite images.

Several committee members noted that it is worthwhile to distinguish different types of areas where clearwater is mixing with the turbid water of the Tanana. Both upwellings and surface water mixing zones may be used by fish, but they may have some different characteristics, for example whether they are perennial or seasonal.

A second spring survey is scheduled for March and April, 2000 to pick up evidence of year-to-year variation. Photos from the study will be overlain on Gordon Worum's base map and made available on CD.

LITERATURE REVIEW UPDATES.

Large woody debris. Jim D. reported that he and Jim Reynolds have found few citations on LWD in glacial systems. Jim R. searched the UA files and found little information on large woody debris in Interior Alaska. Jim R. confirmed this finding with Mark Oswood. Jim R. did forward an excerpt from a 1985 thesis on the Chena River by Kristine M. Lee (attached) which contained some observations that chinook salmon use logs and debris for cover, and that grayling and whitefish were not observed to use such cover. Jim R. also sent written comments stating, "Contrary to what I said at the November 30 meeting, there is essentially no information on the

ecological role of LWD in arctic or subarctic streams, glacial or clearwater. I confirmed this with Mark Oswood, who said it would top his list of science pursuits if he had "another career" in Alaska. The Lee thesis provides only casual observations on the use (or lack of use) of LWD by juvenile fish, in the Chena River, as cover."

Nick H. said that most of Doug Mecum's sampling in the Tanana did not focus on LWD. He also reported that the consensus of the Western Division of the American Fisheries Society is that there isn't any information on what LWD used to do in large rivers in the Lower 48 since snags were actively removed prior to research on these rivers.

Jim D. said that he is still looking for information on glacial systems in southeast Alaska such as the Bradfield and Stikine. Jim F. reported that ADF&G staff, and researchers from the U.S. Forest Service and National Marine Fisheries Service in southeast Alaska have so far identified no published data on LWD in glacial rivers. The ADF&G librarian, Celia Rozen, is continuing to work on the literature search and collecting citations on large woody debris.

Nick H. suggested contacting the Department of Fisheries and Oceans in B.C. or Yukon about Fraser River tributaries that support chinook. Chinook spawn in the clearwater tributaries and rear in the turbid Fraser R. Nick H. noted that chinook have been caught in Airport Slough. Mike D. noted that in the Goodpaster there are few chinook – given the low numbers, studies might not find the juveniles if they are very spread out. Nick H. agreed that juveniles in the Tanana might be at too low densities to catch, even if LWD is important to chinook.

Nick also said that the Fisheries Branch of the Ministry of the Environment has studied fish interactions in interior B.C., but not necessarily in glacial systems. On the clearwater Nechako River, chinook were found only where wood was present.

Dave V. asked about the purpose of the literature search – is LWD in clear streams mainly used for cover? Jim F. said that it also forms islands and pools and can be a source of food and a substrate for insect hatches. Nick H. and Fred D. also noted the value of LWD for providing concentrations of food species. Bob O. added that some studies cite the influence of LWD on river dynamics. LWD may provide resting sites and decrease erosion by decreasing stream velocity. Wood may be important to stream processes rather than as habitat.

Nick H. asked whether the riparian standards in B.C. and the Pacific Northwest have been reviewed. He said that the Canadian standards may not require buffers on either very small or very large streams.

Winter crossings. Bob O. and John F. reported that they found lots of information on ice bridge engineering and construction, but nothing on the impacts of winter crossings on fish habitat. Bob O. said that there were no hits on ice crossings in the forestry and aquatic habitat literature from 1994-99. John F. also checked with Ed Chacho of CRREL.

Bob O. also said that some older CRREL data on ice thicknesses are available, but no one is reporting these data any more. U.S.G.S. hydrology drills holes to take water measurements at gaging stations, but do not record ice thickness. John Fox also said that DOT doesn't recordd

thickness measurements either. Mike D. said that ice thickness in rivers is so dynamic that it is hard to set up stations and that the data are almost irrelevant as thicknesses at the same spot vary year to year. Nick H. concurred. Jim F. said that ice depth predictions can be calculated from equations, but this may only be applicable for lakes.

Bob O. did report a reference to one CRREL report on winter regimes and erodibility that references ice effects on hydraulics and fish habitat. He is still reviewing that reference. He also noted that the USGS web site has some hydrograph data available.

In summary, Bob O.'s and John F.'s work on the winter crossing bibliography is largely complete. Most of the references are tangential to the fish habitat questions since they focus on ice bridge construction. John F. handed out a draft of their bibliography.

Buffers. Jim F. has been working on the LWD topic so far. He will have an initial report on the literature search regarding buffer design at the February meeting. He asked for guidance on what type of information is needed. Marty W. and Bob O. responded that the committee has based its draft recommendation on principles that tie buffer design to needed components. Key information would identify how a buffer should be designed to provide or protect the fish habitat components that are essential to fish production in Interior Alaska, and that are susceptible to effects from forest management activities in this region. Jim F. noted that one focus of Tongass National Forest discussions on buffers was appropriate buffer design for dynamic channels. Bob O. agreed that this is an important question.

Permafrost and silty soils: No report

Remaining topics.

- Bank stability: Bob O. agreed to take the lead, since some of the literature needs to be compiled for the Tanana River Dynamics project as well. Thank you Bob!

- Upwellings: Jim D. and Mike D. graciously agreed to take the lead on this topic. Richard M. also has done some review for the ABFC study and can provide some references. Jim D. will contact Bob Burrows as well.

  Mike D. asked whether Louis Barton's fish survey data could be digitized and compared to the ABFC study data on upwellings. Chris M. will check with Gordon Worum at the Division of Forestry on the feasibility of this idea.

- Winter fish use of glacial streams: Little is known about where fish overwinter. Mike D. reported that good information is available for winter distribution of pike in Minto flats, but much less is known about fish use of the Tanana River during the clearwater period. Information on winter distribution of burbot is fairly good, and are some data and inferences are available for grayling and pike. Nick H. said that he is working on use of night video to study fish use; acoustical equipment also may be useful. He noted that the thermograph of the Tanana River is warmer than expected in summer, and the river clears up in the winter. The Tanana is a complex of water sources, and he would expect an active winter biology – different that what would be expected in headwater glacial streams. Jim D. suggested that

information from the Taku might be relevant based on silt loads and temperature. Chris M. asked what forest management activities might affect winter fish use – is there anything other than ice crossings or activities that could affect LWD? Jim D. responded that we first need to know where fish are to know whether they could be affected. Jim D. (remarkably!) agreed to take the lead on this topic as well.

General. The committee agreed that the product will be an annotated bibliography that highlights references relevant to Interior Alaska, and that documents the sources searched. Marty W. and Jim F. will compile the master list from the lists provided for each topic.

RESEARCH NEEDS.

Marty W. and Jim F. noted that the openings for FY01 Section 319 funds will be coming soon and asked for the committee's input on research priorities. Projects that have been identified before include:

- Phase 2 of the Tanana River Dynamics study (Tanana River from the Kantishna confluence downstream to the confluence with the Yukon and from Tok upstream to Northway)
- Phase 2 of the Tanana Fish Habitat study
- Impact of winter stream crossings and bank cutting on fish habitat
- Role of large woody debris in large glacial rivers.

The committee began by discussing approaches to studying LWD. Questions include:
- What is the role in providing food sources, such as invertebrates?
- Are fish using LWD in glacial rivers? If so, what species use it and how?
- What is the role of LWD in hydrodynamics (e.g., formation of islands, pools)
- What is the residence time for LWD?
- What is the character of detrital input into the Tanana River (e.g., litter, organic soil, LWD).

Nick H. said that the characteristics of stream flow near LWD could be studied, e.g., the velocity at various depths. These data could be used to extrapolate the effects of LWD on heterogeneity of fish habitat. Streams that show adverse impacts from human activities tend to be more homogeneous, e.g. LWD has been removed. A decrease in LWD would probably decrease habitat diversity. Bob O. noted that there are studies of the impacts of LWD on smaller, clearwater streams, but isn't sure of their transferability to the large glacial streams. Richard M. noted that some clearwater streams in the Delta area are exporting LWD to the Tanana River.

One approach would be to evaluate the risk of no buffer and the risk of generous buffer. Dave V. asked what the opportunity cost would be of a 66-foot buffer. Chris M. said that it would vary by site and owner. It could have a big impact on a small owner like a Native allottee. Tanana Chiefs looked at the impacts on one allottee and estimated the cost at $4,000 - $6,000 for that allotment. Impacts also relate to the scale of harvest. Buffers shouldn't be static, but should allow flexibility to increase widths where needed, and should incorporate new information as it becomes available.

The committee concluded that for the purposes of this year's Section 319 requests, continuing the fish habitat and river dynamics projects and initiating an ice crossing study would be the top priorities. The issue of LWD in glacial rivers is huge and would need to be split into smaller studies.

The Division of Forestry and ADF&G Habitat & Restoration Division will work together and will consult with other sources (e.g., CRREL-Ed Chacho, USGS-Bob Burrows, and UAF engineering staff) to design a research proposal on winter crossings and bank cutting.

NEXT MEETINGS

Friday, February 25, 9:00 a.m. – noon Update on literature reviews and research. Marty W. will teleconference from Anchorage and Jim F. from Juneau.

Tuesday, March 21, 8:30-4:30, DNR conference room Completion of literature review reports, research/funding updates, start work on remaining issues (see "Remaining Steps" attached)

HANDOUTS

Excerpt from: Kristine M. Lee, 1985. Resource partitioning and behavioral interactions among young-of-the-year salmonids, Chena River, Alaska. Master's thesis. University of Alaska. (copy attached)

1-13-00 Draft of Literature Review of Ice Thickness and Ice Bridges/Incomplete, compiled by John D. Fox, Jr. and Robert Ott

TO DO:

Marty/ Jim F.: Talk to Ed Chacho of CRREL about participation in the committee re winter crossing.

Chris M. -- check with Gordon Worum feasibility of digitizing Louis Barton's data and comparing it with the upwellings

Literature reviews:
Large woody debris -- **Jim D.** and **Jim R.**
Permafrost and silty soils -- **Deanne P.**
Ice bridges -- **Bob O.** and **John F.**,
Buffer strip design -- **Jim F.** and **Jim D**..
Bank stability -- **Bob O.**
Upwellings -- **Jim D.** and **Mike D.**
Winter fish use of glacial streams -- **Jim D.**

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #8; February 25, 2000
DNR Large Conference Room, Fairbanks, AK

Attendance

Steve Clautice	Bob Burrows
Mike Doxey	Chris Maisch
Jim Durst	Bob Ott
Jim Ferguson (by phone)	Torre Jorgenson
John Fox	Marty Welbourn Freeman (by phone)
Deanne Pinney	

Visitors
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council

Note: Work commitments/assignments are listed at the end, under "To Do". Handouts referenced in the minutes are available from either co-chair.

MINUTES FROM MEETING #7

The committee reviewed, amended, and approved the minutes from the January 13, 2000 meeting.

ANNOUNCEMENTS

Bob O. announced that Will Putman from Tanana Chiefs Conference presented a poster with preliminary results from the Tanana River Dynamics project at the Alaska Surveying and Mapping conference in Anchorage. The poster focused on the technology used in the study.

Bob B. announced that the U.S. Geological Survey is cranking up a big 5-year effort on the Yukon watershed as part of the National Water Quality accounting program. As part of the project, the USGS is printing a retrospective of available information on the Yukon watershed from Canada to the mouth of the Yukon, including GIS databases.

Chris M. will attend the Yukon River Drainage Fisheries Association meeting March 7 at Fort Yukon. Chris has been asked to speak on several topics, including an update on the Region III riparian committee process.

RESEARCH UPDATES

Tanana River Dynamics. Bob O. reported that Tanana Chiefs and the Division of Forestry are making headway on the Tanana River Dynamics project. The deadline for getting all vegetation types on airphotos and georeferenced is mid-March. The cooperators will then start the change

analysis. The Division of Forestry is still working on some of the satellite imagery. The cooperators still expect to finish phase 1 of the project by the end of fiscal year. Some sites on the imagery will need manual adjustment – for example, ice scouring has removed vegetation in some areas. Without manual adjustment, the loss of vegetation would mistakenly show as erosion. The cooperators are working hard, and have experienced cost overruns, so that both TCC and the Division of Forestry have more than met the matching fund requirements. In addition to the poster for the surveying and mapping conference, the cooperators plan to do two peer review articles – one each on techniques and results, and to present a poster or paper at the International Conference on Wood in World Rivers conference in Corvallis, Oregon in October, 2000. Steve C. brought in an example of the poster sent to the surveying conference.

Upwellings. Richard M. showed late fall (November 30) photos taken for the upwellings study. These photos are the first look at river during freezeup. They show more open water and overflow features. The low angle sun casts tree shadows almost across river, but open water can still be discerned in shadow areas. Earlier photos showed a tongue from the Delta River upwelling extending downriver. The November photos show discontinuous strings of open water throughout the study area. They also show green ice on surface, and Richard said he still needs to determine what it means. On the Tanana River between Delta Creek and the mouth of the Delta River there are multiple sources of clear water. This is evidence for a scenario in which upwellings occur just before groundwater hits the river corridor. The photos show some icing over in the Richardson Clearwater. Areas south of the Richardson Clearwater show evidence of stream headings, for example an open water area is visible adjoining a beaver dam. There is also evidence of upwelling sources in the vicinity of Whitestone Farms. Richard pointed out that open water is visible beginning at the mouth of Delta River on both shores and near the middle. Jim D. noted that Commercial Fisheries Division biologists walk all the channels at the mouth of the Delta River to count fish during spawning season. The project staff are working to rectify images to a base map. It would be interesting to compare the upwelling data to the erosion patterns. Chris M. said that it is technically feasible to overlay the upwelling maps with Louis Barton's data, but he doesn't know how much time it will require.

Fish Habitat Identification. Jim D. reported that ADF&G is preparing for May-June sampling for the Tanana Fish Habitat identification project. The scope of work will vary depending on whether ADF&G receives Section 319 funding for the project for FY 01. ADF&G issued the project update for the Second Quarter of FY 00 in mid-January. The quarterly report includes the raw data on water quality and fish samples from the 1999 field season. Staff are adding information on vegetation to the data now.

LITERATURE REVIEW UPDATES.

Large woody debris. Jim D. and Jim F. have reviewed the listing of literature compiled by the ADF&G librarian, Celia Rozen. He described one potentially relevant paper by Timothy Abbe and David Montgomery from the University of Washington Dept. of Geological Sciences on LWD in large rivers (Abbe and Montgomery 1996). The study followed point bar jams over time with channel changes. Abbe sent Jim F. information on engineered log jams in the Stillaguamish River, where over 400 logs were tagged and tracked. The log jam structures

remained intact. Abbe's thesis was on the effects of log jams on geomorphology of large rivers. Jim F. or Jim D. will call Abbe to discuss the research and determine its relevance to interior rivers. Jim D. also noted a 1998 dissertation at the U.W. Center for Streamside Studies on residence time for LWD in large rivers, including differences between conifers and hardwoods. Eighty percent of the LWD was <50 yrs old, although some remained much longer. The half-life for LWD in the Queets River mainstem was 10 years. Impacts from depletion of LWD inputs could be evident in 3-5 decades. Bob O. said that similar findings have been reported for coarse woody debris in forest stands where woody debris has accumulated over a long time. The wood must be replenished, even though the decay rate is slow. Jim D. said that Abbe's drawings show wide root masses compared to what exists in Interior – the root structure could change residence time. Bob O. asked whether the Queets is an aggrading river? Jim D. said that he will find out.

Abbe, Timothy B., and David R. Montgomery. 1996. Large woody debris jams, channel hydraulics and habitat formation in large rivers. Regulated Rivers: Research and Management 12:201-221.

Jim F. also noted a Montgomery/Abbe/Buffington paper on bedrock and alluvial channels. On bedrock channels in mountain streams, LWD was extremely important to stream structure, and the largest trees were most important for forming jams and pools. The concept of key pieces of LWD to anchor and form debris jams appears in more than one reference. Lastly, he mentioned a CRREL study on "Debris in the Chena River" that catalogued debris, log jams, etc. Deanne P. has a copy of the paper.

Jim D. will try to continue contacts with the U.W. group while Jim F. is on leave. Bob. O. volunteered to help contact the UW group.

Winter crossings. Bob O. and John F. have a second draft of the bibliography for winter crossing, with more of the citations annotated. They have eliminated sources not relevant to topic. John F. noted that there have been numerous attempts at predicting thicknesses, and it does work for rivers as well as lakes, but results are very site-specific. Irwin "Rocky" Rhodes. has summarized this work. Maximum ice thicknesses in rivers ranges from about 100 cm in southern parts of interior Alaska to 150 cm in the northern parts. Ed Chacho of CRREL has tried putting booms on rivers to create frazil to initiate freezing for ice bridges. There is some information on the relation of pools and riffles to ice thickness, and on the relation of water temperature to ice thickness. John noted that studies suggest that snow removal to speed freezing wouldn't cut flow off from waters deeper than 5' since freezing doesn't occur deeper than 5' under these conditions. To thicken further, you have to add ice on top. Jim D. asked whether the bottom of a floating ice bridge would move lower in the water column from the weight of added water on top to thicken the bridge, and John responded that it could.

Bob O. reported on a national summary of climate change assessment that includes the Alaska region. The summary indicated that the number of growing degree-days has increased, and the number of days with ice cover has decreased. In response to questions, John F. said he knows of no analysis of historical data for trends in the dates of freezeup or changes in ice thicknesses. Data exist, but it isn't clear whether the record is long enough to show trends. Chris M. noted that snow surveys have a long data set on snowfall dates and amounts. John F. said that freezeup

dates are also available from weather records. Bob O. reported that the Dry Cr. mill said they now have to wait longer into the winter to create ice bridges than they did a few decades ago.

Bob B. said the retrospective on Yukon R. studies has compiled some of these data, including Tanana and Nenana breakup dates and ice thicknesses, and some info on climate change. One researcher (Tom Osterkamp) extrapolated from data on temperature changes at 30 m depth predicted the loss of all permafrost south of the Yukon River within 30 years. Long data sets also exists from Smith Lake on the UAF campus. Fred D. suggested that some records might be available from beaver trappers.

Bob O. noted that climate change information is only relevant to the committee's work if it affects how ice bridges are constructed.

Permafrost and silty soils: Deanne P. handed out a first cut at the bibliography on this topic. Most of the citations are from CRREL, USGS, or DGGS studies. She is also checking journal articles to cull out the most relevant information. She is focusing on studies from Interior Alaska rather than the North Slope. Winter vs. summer use and degree of disturbance are critical issues for determining the effects of different activities. The type of substrate also key – whether the substrate is fine-grained or gravel. She noted that there has been discussion of whether we need to be considering harvest areas, since there is a general belief that there are few harvestable trees on permafrost. She said that what matters is depth to permafrost. If the active layer is deep, you can still have harvestable trees over permafrost. There may also be trees in transition zones along permafrost areas and it is hard to identify permafrost boundaries without drilling. We should consider the presence of permafrost because there could be trees in permafrost areas, then determine whether disturbance on permafrost areas could affect water quality or fish.

John F. noted that water collects in swales with or without permafrost and can be start of gullying. Swales may be associated with ice melting, on south facing toeslopes for example. Torre J. added that south-facing toe slopes can be very ice-rich and subject to thermokarsting, and can have productive forests, but they are not in big stands with commercial value for harvesting. Such sites could be problem areas for road-building. John F. described a site at 17-Mile Hill on Togotthele land where roads were cut across the top, middle, and bottom of the slope. There was substantial gullying and sediment transport from the roads at the middle and the bottom of the slope . He added that it is hard to separate erosion caused by thawing from other erosion in loess.

Bob O. will give Deanne his paper on winter road-building effects in permafrost areas. One road was in colluvium and more subject to thawing. However, channeling didn't occur because it was on flat ground. There were significant differences in thawing on the different sites, but it isn't clear whether the differences are biologically significant. Summer access often is the major cause of impacts from winter roads. His study documented ice lens thawing both on and off the road bed – thawing occurred because the road was in a thermokarsting area, but wasn't caused by the road.

Deanne cited a study by Linell, 1973 that compared a control plot with a plot that was harvested only, and a plot that was harvested and had the moss removed. Plots were monitored for 25-30

years. The plot with the moss removed has deep melting. Melting also occurred in the plot with just trees removed. Bob O. noted that the study was done on polygonal ground.

Torre J. noted that permafrost in the Interior is so warm that disturbance often causes thawing. We need to determine the conditions where melting could lead to water quality degradation. For example, in flat areas, thawing occurs, but the mat stays intact. Effects are very site-specific. In black spruce areas on abandoned floodplains, he has found lower ice content in the soil because of frequent burning. He found the highest ice content under birch stands.

Bank stability: Bob O. reported that this topic isn't done yet, but he will be working on it in conjunction with the Tanana River Dynamics study. John F. has some references with good diagrams. Bob O. noted that this topic overlaps the permafrost topic for studies of the effect of permafrost on bank stability.

Upwellings: Jim D. and Mike D. – No report yet.

Buffer strip design: Jim F. said that Celia Rozen's library search hasn't yielded anything relevant yet, nor has he found sources from Tongass National Forest studies that are relevant to local river systems, particularly the large rivers. The committee emphasized that the focus should be on documenting the principles used to design buffers rather than the specific standards in different areas. Bob O. passed on some papers earlier to help show mathematical principles on things like sun angles, shadows, etc.

Steve C. reported that state timber sales have harvested about 3100 acres since 1966 within ½-mile of the Tanana River from Kantishna to Tok. About 17% of the total state harvest has been within this zone.

Winter fish use of glacial streams: Jim D. has reviewed information from Jim R. on the Chena River. He hasn't found anything useful on this topic yet. He will talk more with SE researchers to find out if there is relevant information from their unpublished data. ADF&G has some data from following fish over the winter. Mike D. talked to ADF&G's burbot biologist about winter stomach contents, but the results weren't helpful because most of the burbot were caught after spawning and their stomachs were empty.

RESEARCH FUNDING UPDATE

Marty F. reported that the resource agencies met on February 23, 2000 to discuss priorities for Section 319 funding for forest practices projects. DNR and ADF&G are both requesting funds for field implementation of the Forest Resources and Practices Act and regulations. DNR is also requesting funds for phase 2 of the Tanana River Dynamics project and for research on winter crossings. ADF&G is requesting funds for a second year of sampling for the Tanana River fish habitat identification study. ADF&G is also requesting funds for three projects outside of Region III. Field implementation and Region III projects are high priorities for the resource agencies.

NEXT MEETING: TUESDAY, March 21, 8:30-4:30 Completion of literature review reports, research/funding updates, start work on remaining issues

HANDOUTS

TO DO:
Marty/ Jim F.: Talk to Ed Chacho of CRREL about participation in the committee re winter crossing.

Complete literature reviews:
Large woody debris -- **Jim D.** and **Jim R.**
Permafrost and silty soils -- **Deanne P.**
Ice bridges -- **Bob O.** and **John F.**,
Buffer strip design -- **Jim F.** and **Jim D**..
Bank stability -- **Bob O.**
Upwellings -- **Jim D.** and **Mike D.**
Winter fish use of glacial streams -- **Jim D.**

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #9; March 21, 2000
DNR Large Conference Room, Fairbanks, AK

Attendance

Marty Welbourn Freeman (phone)	Torre Jorgenson
Chris Maisch	Deanne Pinney
Jim Ferguson	Al Edgren (phone)
Jim Durst	John Fox
Bob Burrows	Bob Ott
Jim Ferguson	Steve Clautice

Visitors
Richard McCaffrey, Alaska Boreal Forest Council

Note: Work commitments/assignments are listed at the end, under "To Do". Handouts referenced in the minutes are available from either co-chair.

MINUTES FROM MEETING #8

The committee reviewed, amended, and approved the minutes from the February 25, 2000 meeting.

RESEARCH AND FUNDING UPDATES

Tanana River Dynamics. The project is continuing and is about a week behind schedule. Researchers have identified some rectification problems with the satellite imagery received from Space Imaging. Will Putman presented a poster at the state Surveying & Mapping Conference. The poster received 3rd place in the People's Choice awards. The project team will submit an abstract to the Wood in World Rivers conference for a paper on project results and applications, and for a poster on the technical aspects of the project.

Fish Habitat Identification. ADF&G is working on logistics for the 2000 field season.

Upwellings. Richard M. led a discussion on groundwater interactions with the Tanana River. Key points include:

- Warm water for spawning habitat may come through interflow in gravels as well as from true groundwater upwellings. Warm water input may come through either path.
- Open water leads are identifiable, but you can't discern groundwater upwellings from discontinuous within-channel flow in the photos.

- Dispersed areas of groundwater input in discharge plumes will be more difficult to detect from the air than concentrated inputs from upwellings.

- Flows from groundwater sources have various levels of dissolved oxygen depending on how much mixing has occurred. Some apparent "upwellings" tested last year had 9-10 ppm of dissolved oxygen, which is not predicted in groundwater before it reaches the surface.

- There's a lot of local complexity in the groundwater – surface water interactions in this area.

- Flows from the deep aquifer to the surface do occur, but the flows visible on the photos from last winter are not this process. Oxygenated flow may enter the channel at a bar or island and enter the river flow downstream. There is intermittent subsurface flow between the surface flow channels. USGS studies at Bluff Cabin Slough on the Tanana River and Hodgin's Slough on the Chena River (Ray Hander, Jim Finn, and Scott Maclean) show that there is a head in these areas and it is oxygenated – therefore it is flow through the hyporheic zone, not groundwater that is just emerging.

- Mixing of oxygenated surface water and deoxygenated groundwater may occur in the very upper part of the aquifer immediately adjacent to flowing channels.

- The top 20' of the aquifer below the Tanana Flats contains oxygenated surface water and deoxygenated groundwater mixing.

- The water table in islands will be recharged with surface water during high flows. Islands aren't reservoirs because the gravels transmit the water too quickly. Other parts of the floodplain could act the same way.

- The Delta reach is close to the AK Range and therefore receives a large volume of groundwater seepage in its channel.

- The biggest contribution of true groundwater upwelling may be the seasonal warming; the oxygen is picked up during intergravel flow.

- Seepage from the aquifer along the length of a channel may have a greater contribution to flow than any point-source upwellings.

- Subsurface water gradients may be different than surface elevation gradients.

- Tree growth on floodplains may also be affected by the abundance of moisture -- tree ring studies by Phyllis Adams show that floodplain trees are not drought-stressed and tree growth is synchronized with flood events rather than rainfall. The influence of water temperature on tree growth is unknown. Jim D. saw similar patterns in SE Alaska where groundwater flow was associated with good Sitka spruce sites.

- Chris M. confirmed that it is feasible to create a layer from Louis Barton's data to compare with the ABFC data. Jim D. – will be valuable for evaluating FYSTSs and FLUPs.

- The direction of subsurface flow in the area between the Tanana and Chena rivers changes depending on flow levels in the rivers. The Chena can recharge the adjacent banks when its flow is high.

319 Funding -- The resource agencies met and agreed to commit Section 319 funding for field implementation of the Forest Resources and Practices Act by ADF&G and DNR for fiscal year 01. They also agreed to commit funds for phase 2 of the Tanana River Dynamics and Tanana Fish Habitat Identification projects. Other projects, including a winter crossing project will be considered as part of the competitive pool. Proposals for the competitive pool are due to DEC by April 25, 2000 [Note: The RFP is available on DEC's web site.]

Winter crossing study. Chris M. asked for help to narrow the research questions into a feasible and fundable study. The main questions are the impact of ice crossings on

- scouring rates in overwintering habitat
- freezedown in overwintering habitat
- scouring by ice blocks from ice bridges during breakup
- impacts from bank cuts to access ice crossings.

Jim D. suggested that the effect of scouring is probably more localized than the effect of freezedown, and may only occur in bigger rivers. Freezedown into subsurface flow could affect a bigger area of habitat. Bob B. will look at models for research since replicated field studies will be expensive and may have only site-specific applicability. Torre J. said that you can't really set up control cases for ice bridge studies, but gradient analysis might be possible. You could instrument crossings relatively easily. Bob B. noted that scouring may be less important than freezedown during the winter, but might have significant effects during breakup -- the effect of ice blocks at breakup may be the main factor. If you create artificial ice blocks you may increase scouring during breakup.

Torre J. said that one research question could be to look at what to do with an ice bridge at the end of the season -- e.g., should it be slotted to reduce ice damming at breakup? Jim D. replied that ADF&G permits for ice bridges often require slotting or breaching (e.g., Iowa and Smallwood creeks). A slotted ice bridge built repeatedly by Chapman on Shaw Creek in the Delta area works well. Torre J. suggested that this indicates that effective design may already be known.

The committee discussed whether the focus should be on identifying good crossing sites, defining best management practices, and monitoring bridges that are being used operationally. Jim D. noted that the current preference is to use seasonally dry sloughs that are outside known spawning areas – there is little fish impact at these sites, they are easy sites for construction, and the provide a solid base for the crossing.

There was general support for an adaptive approach beginning with monitoring and development of a handbook. The handbook could be revised based on monitoring results. Crossing sites could be monitored before and after bridge construction.

Chris Maisch will work with Bob Ott, Jim Ferguson, Al Edgren, Bob Burrows and other interested parties to develop a proposal for 319 funding. Chris will check with John F. as well.

LITERATURE REVIEW UPDATES.

Large woody debris. Jim Durst talked to Tim Abbe from the University of Washington, and he will send a copy of his dissertation, including information on the size of LWD pieces. He noted that the longest residence time is for LWD whose bole length is at least three times the spread of root wad. Stumps are the least stable due to buoyancy factors. Jim D. handed out a first draft of a reference list. He has begun the annotations and is working on computer literature searches.

Winter crossings. John F. handed out the 3rd draft of an annotated bibliography. Bob O. said that the University library has some new resources and databases that he is checking. The review for this topic is nearing completion. John F. also handed out materials on ice thickness and processes:

- CRREL reports on maximum ice thickness and dates
- Report from Jim Aldrich in Northern Engineer that used CRREL data to create return periods for different ice thicknesses (probability distributions)
- CRREL flow chart on processes
- AEIDC Su Hydro study that proposed a study on the biological effects of ice thickness. The study was not done, but some biological criteria were reviewed.

Bob B. noted that a USGS study at Bradley Lake by Ron Rickman reported dissolved oxygen levels during ice-in and ice-out conditions.

Permafrost and silty soils: Deanne P. is researching sources at the University library and annotating the references.

Bank stability: Bob O. has skimmed 1400 titles. He has not found many relevant sources yet, but is still compiling lists to search.

Upwellings: Jim D. and Mike D. are still working on this topic. They noted that "upwelling" doesn't exist as a key word.

Buffer strip design: Jim F. reported few additional relevant sources.

Winter fish use of glacial streams: Jim D. reported that he is finding some interesting references. The type of glacial stream in the studies varies. Some streams are relatively clear. Some are from high arctic or antarctic sites and are less relevant. Some Scandinavian, Swiss, and Russian references may be relevant, although most concentrate on physical processes. Most rivers found so far have either higher (e.g., Glacier Bay streams) or lower sediment levels than the Tanana. He is also reviewing some papers from the Taku River and unpublished sources on the Stikine and Bradfield rivers.

HANDOUTS

- First draft of bibliography for LWD, Buffer Strip Design, Upwellings, and Winter Fish Use of Glacial Streams (Jim Durst)
- Third draft of bibliography on winter crossings (John Fox and Bob Ott)
- Second draft of bibliography on Permafrost and Silty Soils (Deanne Pinney)

TO DO: Marty WF will contact Ed Chacho.
Marty WF will check with committee members on next meeting date
Compete literature reviews with annotated bibliographies

NEXT MEETING: ALL DAY Thursday, May 4 or **Tuesday , May 9.**

- Completion of literature review reports,
- Research/funding updates,
- Start work on remaining issues

Region III Forest Practices Stream Classification Committee
MINUTES – Meeting #10; May 4, 2000
DNR Large Conference Room, Fairbanks, AK

Attendance

Ed Chacho (a.m.)	Steve Joslin
Steve Clautice	John Fox (a.m.)
Mike Doxey	Chris Maisch
Jim Durst	Bob Ott
Jim Ferguson	Deanne Pinney
Nick Hughes	Jim Reynolds (p.m.)
Marty Welbourn Freeman	

Visitors
Fred Dean, Alaska Boreal Forest Council
Scott MacLean, USGS
Richard McCaffrey, Alaska Boreal Forest Council
Chris Stark, TVSF CAC

Note: Work commitments/assignments are listed at the end, under "To Do". Handouts referenced in the minutes are available from either co-chair.

INTRODUCTIONS AND ANNOUNCEMENTS

Ed Chacho introduced himself. He brings 20 years of experience with CRREL in ice bridging and surface hydrology to the committee.

Richard McCaffrey announced that the Alaska Boreal Forest Council is sponsoring "People and the Forest", a conference showcasing the diverse work being done studying and using the interior Alaska boreal forest.

Bob Ott reported that Tanana Chiefs submitted a grant application for Section 319 funds to consolidate information on construction methods and ecological impacts of winter roads and ice bridges, including both published information and local expertise. The project would also identify information gaps for research.

MINUTES FROM MEETING #9

The committee reviewed, amended, and approved the minutes from the March 21, 2000 meeting.

RESEARCH UPDATES

Scott MacLean reported on the study he is doing with USGS on upwellings in Hodgins Slough on the Chena River and on a feeder channel into Bluff Cabin Slough on the Tanana River. The study documented DO, temperature, pH, and pressure differentials along transects at both sites.

Using piezometers to measure pressure, Scott could identify areas of upwelling and downwelling. Egg baskets were also used to examine salmon egg survival throughout the winter.

At the Bluff Cabin Slough site, September, 1999 data showed DO levels at 90% saturation (11.3 ppm) February readings were slightly lower, but still high (10.9 ppm). Scott suspects that the high DO levels are from intragravel flow . Egg survival was high (80%) to the eyed-egg stage in mid-December. Survival plummeted in the next two months – many baskets had no surviving eggs. Salmon fry samples are being collected now. 130 chum salmon spawned in the Bluff Cabin site last fall. Coho don't spawn in the study slough, but use the area after hatching. Temperature at the study site was consistently 4.5-5.5 degrees Celsius throughout the winter and the water was ice free unless the air temperature was below –20 degrees C. Large woody debris was present at the top of the island above the Bluff Cabin study site and at the entrance to the study site slough. No downwelling was detected at the Bluff Cabin site.

The researchers are interested in identifying what factors affect survival, why survival decreased rapidly at the eyed-egg stage, whether deposition of fine sediments increases, what gas is present in the substrate around the egg baskets, and what effects the gas has. They would like to know whether other upwellings are similar. Gas vents occur throughout the area.

Scott said that the water on the south bank of the slough clears up first in winter. Richard M. noted that you can see the difference in turbidity between the north and south banks on the ABFC airphotos.

Steve J. noted that Bluff Cabin Slough is probably the most productive site for salmon spawning and summer use in the upper Tanana River system, with the exception of the mouth of the Delta R. He said it is not typical of areas where forestry operations are occurring. He said that the Division of Forestry would never put a river crossing in the side slough where the fish are spawning, except with a steel bridge – it wouldn't be possible to build a suitable ice bridge there. He also noted that the Bluff Cabin Slough area has very little harvestable timber on the south bank of the Tanana. The area's vegetation is strongly influenced by the large amount of shallow ground water where it interfaces with the Tanana River. However, the adjacent island in the Tanana has good stands of white spruce.

Steve C. asked Scott whether activities on the banks at this site would harm fish. Scott said that if sediments increased and drifted downstream they could impact eggs. He also reported 4-wheeler tracks on the stream bed which could impact the redds. Jim D. said that egg sensitivity to disturbance varies – they are more sensitive in the early egg stage, tougher in the eyed-egg stage, and more sensitive again near emergence.

In the Tanana Basin, salmon run timing is roughly

	Fertilized egg	Eyed-egg	Hatch	Emerge
Summer chum	August	October	November	April
Fall chum	October	December	January	April-May

Tanana River Dynamics. Bob O. said that an abstract for this project has been submitted to the Wood in World Rivers conference scheduled for the fall in Oregon. Extrapolating from a 17-mile sample area near Fairbanks, the preliminary estimate of the area eroded over 20 years is 9,600 acres. Half of the riverbank area is forested, contributing about 11.5 million cubic feet of wood to the river through erosion. Forty-two percent of the eroded wood comes from 15 of the land area – the large diameter white spruce stands. Tanana Chiefs has finished rectifying the vegetation maps. The project managers met with Owen Mason, UAF geomorphologist, who will be analyzing erosional processes and landforms.

Fish Habitat Identification. Jim D. reported that ADF&G is hiring a Technician II and hopes to be sampling the river before Memorial Day.

Upwellings. Richard M. brought photos taken April 16, 2000. This is the first set of repeat photos from the same season in different years. The photos showed that the main channel is dominated by influence from upriver. The ice condition in the main channel is only understandable by knowing what happens upriver. The influence of the Delta-Clearwater varies by season and year. In the main channel, the clear water plume from the Delta-Clearwater is so extensive that it masks specific upwelling sites. Delta-Clearwater flow is a significant proportion of the total Tanana River flow. Jim D. noted that Bob B. reported Delta-Clearwater flow accounted for 20% of the total Tanana River flow in the winter.

In the Richardson-Clearwater complex, BFC has observed streams with a range of ice and open water conditions. In the streams where ice cover is present, evidence of upwelling is common in the form of strings of open water patches. Groundwater vents appear to come and go.

In the Delta-Clearwater area, discharge from groundwater streams continues in winter, but no clear water input from the north bank streams (e.g., Goodpaster R.) is detectable in the April photos.

Jim D. said that ADF&G sampling showed that the water chemistry bank to bank in the Tanana was similar except immediately downstream of clearwater or humic tributary mouths, but turbidity levels differed.

Chris M. asked whether "open water flow" or "upwelling" is the key factor for consideration. He noted that open water is the key factor for ice bridge construction. Chris S. suggested that upwellings may not come through the ice, but Chris M. said that significant upwellings thaw the ice. Jim F. said that use of these areas is self-limiting because an operator would test the ice thickness first. Jim D. reported that studies show fish select upwellings in particular.

LITERATURE REVIEW UPDATES.

Large woody debris. Jim Durst thanked Bob Ott for providing a number of references. Jim is continuing to polish the report and to try to track down information from Abbe and Montgomery in Washington state. Many publications address wood in waterbodies, but it is often hard to tell how big the wood is, and how large the stream is.

Jim D. said that the role for LWD may be different for small streams than large ones. In large glacial streams, the chief role of LWD may well be in shaping stream morphology than directly providing fish habitat. LWD adds roughness to glacial streams, provides bank armoring, contributes to formation of river bars and islands, and can block side channels. Historical removal of wood simplified channel structure even in large rivers. However, during the low flows in the winter, much LWD is left high and dry and doesn't affect fish habitat. Ice may provide cover in the winter. The main fish habitat role for LWD may be May-June. Jim F. added that the sense that the role of LWD in big rivers is primarily hydrologic is from the research, and many of the researchers are hydrologists. Abbe's work documented the hydrologic role of LWD. Jim D. noted that LWD may also be a "biofilm" that provides fish food. Bob O. said that the role of LWD in inversely proportional to the size of the river. Fish habitat may be affected on a different scale, e.g., by blocking a channel and reducing flow.

Nick H. said that the role of LWD in stream morphology is very important to a river like the Tanana. The mechanism by which fish are affected is different. He agreed that wood decreases in importance as the size of the river increases if other conditions are equal. He said that in New Zealand there are wide variations in flow rates, and that high flows blow out the wood. In these streams the channel is formed by boulders rather than wood. In the Tanana River, the gradient is less and wood stays longer. We don't know about the role of wood for food production and winter cover and it would be good to find out more.

Jim D. noted that salmonids may use cover differently than other fish, with coho and chinook fry using wood for cover more than burbot. When disturbed, salmonids run for cover, other species just run, based on Lee's thesis work on the Chena River. Use of cover is affected by a number of factors, including the clarity of the water, the size of the stream, and the species of fish. Wood may play a short but important role during migrations.

Chris Stark asked whether the ADF&G 319 study included any work on LWD. Jim D. said they are considering it, but that it is hard to sample near wood.

Nick asked whether ADF&G is going to look at winter wood use in the Tanana. Jim D. said they would like to, but have no current research on this topic. They may try to identify places for using underwater cameras to study winter fish use of cover.

Fred D. suggested that in the Tanana River where there is a low gradient and no rocks, that log jams may be important. He would like to know how big a log jam is needed to form islands and asked whether the Tanana River Dynamics study could note whether log jams are forming islands. Bob O. responded that lower level photography would be needed to study log jams. Jim D. added that Abbe and Montgomery have developed estimates of how much wood is needed for island formation. There are examples of buried wood found in islands in the Tanana.

Chris M. said that on a recent flight up the Tanana to Tok that observed little wood in the channel at current water levels. This would be a good time of year to take low level air photos for stem mapping of LWD. Steve J. also said that he has observed no log jams in the river in the Delta area. Chris M. added that there is more wood in the river below Nenana.

Winter crossings. John F. reiterated that much of the existing literature isn't relevant. General papers by Rhodes and Carlson provide helpful background on ice bridges. Ice thickness is constrained by the number of freezing degree days. Ryder has data on ice thickness back to the 1930s. John noted that operators won't build ice bridges in areas of open water, and that there are some guidelines on ice bridge construction. Some site-specific factors such as rising ice and water levels during the winter haven't been documented. John recommended a follow-up project to compile a convenient narrative of existing wisdom on ice bridges, capturing both local experience and the literature, and recognizing regional differences. Ed Chacho and CRREL are major sources of local knowledge.

John summarized his work by saying that the review did not find any studies on impacts of ice bridging on aquatic habitat. There isn't even knowledge of how ice bridges affect hydrologic conditions that in turn could affect aquatic habitat. Ed Chacho added that there is information on aufeis formation and its downstream impacts – impacts from ice bridging may be similar.

Permafrost and silty soils: Deanne P. summarized this section. She said that we should recognize permafrost as a factor in Region III that is different from other regions. Permafrost can occur in areas with timber cover, but these areas are typically relatively level with little stream flow. The reference by Hopkins describes the depth to permafrost under different vegetation types, and reported depths as shallow as 2 feet under white spruce stands. The Stoeckeler reference relates vegetation types to permafrost and suggested a correlation between the height of white spruce stands (in feet) and the depth to permafrost (in inches).

Roads are a bigger issue than harvesting with respect to permafrost impacts. There are many references on the impacts of road disturbance on permafrost. The less surface disturbance the better – avoid disturbance of the vegetative mat if possible. Winter roads are best. Permafrost degradation occurs even from clearing trees without disturbing the vegetative mat. *Sigafoos and Hopkins* reported on instability of roading on slopes with permafrost. Disturbance creates nick points for erosion and gullying in silty soils.

Bob O. noted that the Tanana Chiefs study on the impact of winter roads on permafrost showed differences in the depth of the active layer under winter roads, but on flat ground there wasn't water flow or standing water associated with the thawing. He asked whether such thawing is biologically important. Chris M. asked Deanne to review the draft winter road standards for the Tanana Valley State Forest Management Plan. The emphasis is on impacts to water quality, rather than on preventing any thawing. Thawing isn't a problem if the ground is thaw-stable. Deanne agreed that some permafrost thaw areas look the same whether thawed or frozen – it depends on the substrate.

Bank stability: Bob O. summarized the information on bank stability. He said that stability is influenced by relative pressures in the subaqueous and subaerial zones. The boundary between these zones may vary with water levels. Few references clearly describe the size of the water body studied – e.g., flow rate, gradient, width.

In the subaqueous zone, erosion is controlled by the water-bank properties and by the water speed. In the Tanana Basin, many banks are composites – they have layers of silt, sand, clay, and wood that have varying susceptibilities to erosion. In the subaerial zone, erosion is primarily weather-related. Vegetation has more control over erosion in this zone. As water levels decrease, the pore pressure interior to the bank increases causing erosion and sloughing. Vegetation affects how much of the aerial zone is exposed. Smaller waterbodies are more likely to have vegetation down to the water level. Substrate type also affects the vegetative cover. Vegetative control of bank stability is greater on smaller streams. The impacts of vegetation depend on the relative rates of bank sloughing and removal of sloughed material. On big streams, soil is removed quickly and vegetation has less control.

Grass and legumes provide more erosion control than trees due to their root mats and the light weight of the cover. With tree cover, tree weight can accelerate bank erosion relative to erosion rates under grass. On the Tanana River, banks will still erode with grass cover, but not as fast as with tree cover.

Erosion rates depend on the size of the water body and the relative size of the water body to the vegetation. (For ex., a large tree can armor a small stream or increase the rate of bank failure on a large river.) Bob O. referenced studies from Canada, and Alaskan studies by Gatto.

Permafrost affect erosion processes. In permafrost areas, vegetation is an insulating layer. Vegetation removal increases the depth of the active layer, increases soil saturation, and decreases soil strength, which can increase erosion rates.

Jim D. added that substrate and bank height are important. In SE Alaska, tree roots provide some bank armor that they don't on Tanana Basin sites. Jim F. and Jim D. agreed that bank height relative to rooting depth is key. In SE Alaska, roots can go to the bottom of the bank, but in the Tanana Basin, trees are shallow-rooted.

Jim D. said that the intersection of silt and gravel layers is important, and there is more silt in the lower Tanana River. On accreting gravel areas, vegetation is important for increasing stability. He observed some areas with tree cover where deposition occurs at high water, and erosion at low water.

Bob O. added that freeze-thaw cycles, ice movement, boat wakes (e.g., barge wakes on the lower Tanana River), and waves caused by wind also affect erosion rates. The Yukon River erodes more on the north shore where it is exposed to waves from SE winds in summer.

Jim F. noted that much erosion occurs during major events (e.g., floods) during any period. Bob O. refined that idea, saying that channel formation occurs mostly during intermediate scale events rather than extreme events. For example, research buffers on the Tok River didn't erode during floods – surface roughness at the site resulted in deposition during the flood event.

Steve J. said that in cutbank areas (typically about 5' above the water), root wads that tipped over stabilized the banks. Grass is reducing scouring better. Fred D. added that willow is also a good stabilizer. Bob. O. added that willow is used in remediation work.

Bob. O. noted that LWD in small streams can change erosion patterns. Jims F. and D. quickly added that it also creates fish habitat, and that decreased erosion also decreases inputs of LWD. Bob O. agreed, but added that on big rivers the supply of LWD depends more on overall recruitment than on input from local sites.

Steve J. said that river islands with high banks get undercut, but rarely flood. New islands aren't as high.

Ed Chacho described a situation on meanders where deposition can occur on outside bends at high flows, and then erode again at low flows, while erosion can occur on the downstream end of sites where high flows cut off meander necks. Steve J. added that even banks on inside bends erode during high flows.

Buffer strip design: Jim D. said that there are two types of factors related to riparian buffers – 1) near-channel conditions such as shading, rooting structure, and falling wood, and 2) far bank issues such as whether to "buffer the buffer" to stabilize the buffer in light of local winds and topography.

Jim D. said there is a general assumption about the importance of riparian buffers. There are some studies on filtering that show that 50-100' buffers are effective in protecting water quality. He noted that in winter with frozen ground, buffers may actually contribute nutrients to the stream.

There is some overlap between the buffer and LWD reference list. Good sources of information include 1) studies by Murphy, Koski, and Heifetz in SE Alaska, 2) a symposium in Northern California, and 3) European studies on stream restoration.

Bob O. reported that one study showed that increasing buffer size proportional to the stream width resulted in overprotecting large streams and underprotecting small ones. He asked whether there was any other literature on this. Jim D. said that he wasn't aware of any reference to water body size in the literature on buffer design. Jim F. noted that the Tongass National Forest riparian standards are based on stream channel process groups which incorporate some size factors. The Tongass standards use a tree-height no-cut buffer plus a tree-height area managed for windfirmness. They combine floodplain channels and glacial outwash channels.

Winter fish use of glacial streams and Upwellings: Jim D. reported that these two topics are closely linked and share some references. He found more literature than he expected. Some is from other species such as bull trout, and sockeye in Idaho. There is some information on winter habitat use by burbot. Louis Barton's paper in 1992 started ADF&Gs interest in upwellings by documenting fall chum spawning in the main stem of the Tanana River. His original work provided just a single data point, but subsequent aerial surveys have observed similar patterns. ADF&G would like to repeat Barton's original study but look at coho.

An Idaho study reported 80% survival of emergent fry from redds in upwellings, compared with 64% survival from non-upwelling redds. It appears that fish select upwelling areas for spawning

and that survival is higher in these areas. There are studies on sockeye use of upwellings in the Taku River and from clear streams. The Reynolds paper is a good synthesis.

The key elements in upwellings are warm water temperatures and possibly flow. The warmer water provides thermal units needed for hatching and prevents freezing of eggs. The flow provides oxygen and carries away waste products and may prevent freezing. Fish are using areas with warm groundwater sources that have had time to oxygenate by flowing through gravels. They are not using deoxygenated water that comes to the surface directly from deep flows.

Fred D. added that fish survival may also benefit from the stability of environmental conditions in groundwater upwelling areas.

Jim D. reported that studies of burbot and grayling documented movement between the Goodpaster River, Shaw Creek, the Delta-Clearwater River, and Tanana River. This movement may happen largely in the winter. Grayling found in the Tanana River in the winter aren't seen there in the summer. There is some winter coho use of the Tanana, but kings haven't been found in the Tanana in the winter.

Ice plays a big role in winter use of fish habitat – it affects flows, freezing, and cover. Fish use ice as cover where there are open leads.

Literature review final product. The final product for the literature review will publish the reviews under one cover, but with a separate section for each topic. There will also be a consolidated index by author. There will be a short (~2 pages?) introduction to each section highlighting the the reason for reviewing that topic, summarizing key points, identifying important papers, describing data gaps, and describing the approach for the literature search including key sources and indices, and useful keywords for searches. The final product will be made available in hard copy and on the web.

The leaders for each topic will finish annotating the references and write the topic summary by the next meeting (June 26). Marty WF will compile the topics into a single document and prepare the consolidate index by author. All topic leaders will use the format from the American Fisheries Society for citations (see www.fisheries.org). *[Note: following the May 4 meeting, Bob Ott and Jim Durst provided information on AFS citation format.]* Annotated sections will be single-spaced in 12 pt Times New Roman, with 1" page margins and ¼" indents (see Bob Ott's section for format examples.)

ICE BRIDGING RECOMMENDATIONS

The committee discussed the draft recommendations for ice bridges. The committee agreed that upwellings are important for flow as well as warm temperatures. Flow is needed for oxygenation and incubation processes in the redds and for removal of metabolic wastes.

Mike D. asked whether it is feasible to artificially thicken only parts of a crossing over deeper channels or whether thickening must be done from bank to bank. Steve J. answered that it is possible to add thickness just in the middle.
Nick H. and Jim R. noted that even when fish are mobile, they don't necessarily leave an area to avoid freezing. Alevins are less mobile and can freeze.

Jim R. said that overwintering fish (1 year-olds, 40-50 mm) also use the substrate. Adult fish can congregate in certain areas; grayling congregate in parts of the Chena.

Bob O. noted that overwintering habitat would also include the areas used for spawning, since spawning occurs at shallower depths than overwintering.

Steve J. asked how freezedown into spawning gravel could occur when the water table in the Tanana River deepens during the winter. He said that the water table in the upper Tanana is lowest in October long before ice bridges can be built. Jim D. said that in some places there is shallow water under ice. Steve J. said that he avoids those areas for crossings.

Nick H. said that the key issue in ice bridging is whether the site is important fish habitat. Bob O. agree that the issues are the same for all stream types – it is sensitive habitat that is important.

Steve C. said that natural ice thicknesses are usually great enough for bridging by the end of the year, but augmenting natural ice thickness lengthens the period that an ice bridge can be used.

The revised draft of the ice bridge recommendation follows. Points 1) through 4) were edited during this meeting. The remaining points will be addressed at the next meeting.

C26am

1) Within glacial water bodies (class I.A.), salmon spawning areas are typically associated with upwellings that maintain warmer water temperatures and flow.

2) Water temperature close to groundwater upwellings is typically too warm to allow sufficient ice to develop to support crossings for forest roads.

3) For all water body classes, crossings may be allowed on natural ice. Natural ice thickness may be augmented if site-specific conditions (e.g., water depth) are sufficient to protect fish habitat.

4) Augmentation includes adding ice to the surface or removing snow to increase freezing depths.

5) There are no data to indicate whether or not augmenting natural ice thickness will cause freezing into spawning gravels or overwintering habitat for fish and adversely impact spawning or overwintering habitat.

6) Bed scouring may occur under ice cover due to channel constriction as ice develops. There are no data to indicate whether or not augmented ice *thickness for* ice crossings at or near spawning or overwintering areas will increase scouring that could adversely affect spawning habitat.

7) Fish incubation can occur in gravels under channels that have no surface water during some seasons on some sites (for example, along the Toklat River and at the mouth of the Delta River). Compression or shock from *winter* travel on these sites may adversely impact incubating fish.

HANDOUTS

Scott H. MacLean, James E. Finn, Raymond F. Hander. Quantification of upwelling as a determinant of spawning site selection and quality for Yukon River chum salmon. Notice from Alaska Water Resources Association. April 13, 2000. 2 pp.

Literature searches:

- Permafrost and silty soils (Pinney and Jorgenson), 10 pp.
- Winter fish use of glacial streams (Durst and Doxey), 14 pp.
- Fish use of upwellings (Durst), 8 pp.
- Large woody debris (Durst and Ferguson), 18 pp.
- Buffer strip design (Ferguson and Durst), 9 pp.
- Region III forest practices stream classification committee – Bibliography of Ice Thickness and Ice Bridges (Fox and Ott), 23 pp.
- Factors affecting stream bank and river bank stability, with an emphasis on vegetation influences (Ott), 22 pp.

TO DO:

- Finish annotations for literature review (all topic leaders)
- Put references and annotations into consistent format (all topic leaders; Marty WF will do Deanne's)
- Write introduction for literature review topic (all topic leaders)
- Compile research needs identified so far (Marty)
- Review draft water body classes for possible consolidation (Marty/Jim F.)

NEXT MEETING: MONDAY, JUNE 26

- Review final literature review document
- Finish discussion of ice bridging recommendations
- Discuss whether additional recommendations are needed for areas adjacent to upwellings
- Review the package of recommendations
  - Water body classification system and key – can any classes be lumped?
  - Buffer recommendations
  - Other recommendations (non-buffers)
  - Research priorities

Region III Forest Practices Science/Technical Committee
MINUTES – Meeting #11; June 26, 2000
DNR Large Conference Room, Fairbanks, AK

Attendance

Steve Clautice	John Fox
Mike Doxey	Jim Durst
Bob Ott	Torre Jorgenson
Jim Ferguson	
Nick Hughes (a.m.)	
Marty Welbourn Freeman	

Visitors
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council
Johnny Mendez, GW Scientific

Note: Work commitments/assignments are listed at the end, under "To Do". Handouts referenced in the minutes are available from either co-chair.

INTRODUCTIONS AND ANNOUNCEMENTS

Jim Ferguson brought in updated information on the Wood in World Rivers conference.

MINUTES FROM MEETING #10

The committee reviewed, amended, and approved the minutes from the May 4, 2000 meeting.

RESEARCH UPDATES

Tanana River Dynamics. Bob O. reported that the river dynamics group is "poised for progress". They have finished rectifying polygons and DOF is working on rectifying satellite images. Owen Mason, UAF geomorphologist, is working on geological mapping. A format for reporting the data has been developed – the data will be analyzed by 10 km river segments that can be printed on a single page with data from the original photos, satellite data, a map of changes, and statistics for the segment. The Wood in World Rivers Conference accepted the abstract of a paper on the data. The main analysis of the data is starting in mid-August.

Winter road handbook. TCC did not receive Section 319 funding for the winter road and ice bridge handbook. However, this project could be funded if additional funding is available this fiscal year.

Fish Habitat Identification. Jim D. reported that ADF&G completed June sampling on June 22. Water levels were good for sampling, and researchers were able to reach some areas that were inaccessible in May. Catches were down from the May sample, in part because outmigrating

chum were no longer in the sample area. Some as yet unidentified larval fish were captured in beach seines. Data analysis is in progress. The next sample will begin July 17. Sampling is occurring between the Richardson-Clearwater River and the outlet of Clearwater Lake.

Upwellings. Richard McCaffrey introduced Johnny Mendez, a water resource engineer with GW Scientific. Johnny recently did a preliminary study of groundwater and surface-water interactions in the intertidal zone of two small streams in Prince William Sound. These streams are pink-salmon spawning habitat and are influenced by the Exxon Valdez oil spill. At high tide, the gravels around these streams recharge with tidal water. At low tide, water is discharged from the gravels into the stream. This recharge water is a mixture between out-flowing freshwater from the upgradient watershed and marine water from the cyclic tidal recharge. They are assessing ground-water and stream interactions with temperature and conductivity measurements, and with dye injections. Conductivity was seen to increase during low tides in areas of the stream where marine water, and mixes of marine and fresh water were discharging (upwelling) into the stream. Ground water in the intertidal zone is a combination of water draining from upland areas (mostly snowmelt) and tidal recharge.

The Boreal Forest Council is collaborating with Johnny and with Mike Lilly from the GW Scientific UAF Supercomputer Center on geohydrology. They will monitor an upwelling and relay the data to a web site for public access.

LITERATURE REVIEW

Buffer strip design: Jim F. handed out a new paper by Bryant and Sedell on aquatic habitat. It is a good source with a number of new citations. He also handed out a copy of the riparian buffer recommendations from the Tongass Land Management Plan, which include buffers on glacial outwash streams. Lastly, Jim handed out copies of the draft introduction for the literature review section on buffer design.

Literature review report format. The committee agreed that there should be an overall introduction to the literature review report that covered the background of the process, direction from the Board of Forestry, and existing FRPA standards. Marty will draft this introductory section for the Committee's review.

The committee discussed whether the introductions to the literature review sections should be reviewed by the committee, or should be the sole product of the author. The committee agreed that all introductions would be subject to review, since many readers will look only at the introductions. Committee members will submit their comments to the section authors and copy the co-chairs. The authors will edit the introductions as needed based on the comments unless the author and co-chairs determine that there is a significant issue that merits discussion by the whole group.

A complete report will be ready for distribution to the Board of Forestry at the August 2-3 meeting, but it will still be DRAFT at that time unless the committee decides otherwise at our July 28 meeting.

ICE BRIDGING RECOMMENDATIONS

The committee continued discussing the recommendation for Consensus Item 26, on ice bridging.

Two points in C26am describe a lack of data on the impacts of ice bridges on freezedown and scouring. John F. noted that although there aren't any data, that it is possible to calculate the conditions under which freezedown could occur based on knowledge of freezing processes. Mike D. said that he hadn't observed freezedown into gravels used by fish, but could intuit places where it might happen. He does know places where ice goes down to the gravel. Bob O. added that freezing could also affect fish habitat in slow or still water that freezes to the bottom and could preclude fish from exiting from anoxic water. Jim D. noted that some Title 16 permits require monitoring or drilling to make sure crossings don't freeze to the bottom, and require routing of stream water back beneath the ice if it comes to the surface.

John reported finding a CRREL literature review that included some good references on winter habitat of salmon. One reference notes that portions of the streambed can freeze under certain conditions. This report wasn't based on ice conditions due to bridging, but one can imagine this process being affected by ice thickening.

Mike D. noted that dry gravel can conduct cold faster than water, and can suck the cold further down. John agreed that you can freeze a dry soil rapidly because dry soils have little water to hold heat. Nick H. asked whether ice bridges could dewater the gravel. John F. responded that there isn't an implication that ice bridges cause dewatering.

Nick H. said that in aufeis areas with natural freezing to gravels you can find areas with water running in the gravel, but where the pools are dewatered. John F. described a site on Spinach Cr. where a small plank across the creek caught the snow, reducing insulation under the plank, and causing freezing which backed up water which increased icing upstream. Nick H. said that a similar technique is used intentionally to prevent culverts from freezing or getting covered with aufeis.

Nick H. described ice conditions and winter fish use in a site in 12-Mile Creek near Birch Creek (Eagle Summit). The creek is a mountain stream with grayling. He expected fish to outmigrate to deep holes in the winter. Although large fish moved out, thousands of small fish moved upstream to a 100-200 meter reach with pools about 50 cm deep and riffles. If ice had frozen a few inches deeper or flow had decreased, it would have affected the juvenile fish population for the whole stream – the fish were overwintering in a precarious position.

Nick H. stated that scouring is the chief villain in loss of overwintering fish. Torre added that decreased oxygen is a major concern. Mike agreed, but said that decreased dissolved oxygen (DO) is a result of changes in stream volume or flow, which are covered in the recommendations for 3) above. In assessing whether an ice bridge could be thickened, habitat biologists might consider the availability of open water patches to provide oxygen, and whether the patches would be affected by the ice bridge.

Steve C. asked whether logging vehicles could cause enough compression to affect fish eggs, or whether only larger events like seismic testing caused sufficient compression. Nick H. said that Jim Reynolds has stated that if you move the gravel, you can injure the fish. However, the most sensitive egg stage (before eyeing up) may occur before the period when ice bridges could be built and used in interior Alaska.

The Committee agreed to the following amended version of C26.

C26am2

1) Within glacial water bodies, salmon spawning areas are typically associated with upwellings that maintain warmer water temperatures and flow.

2) Water temperature close to groundwater upwellings is typically too warm to allow sufficient ice to develop to support crossings for forest roads.

3) For all water body types, crossings may be allowed on natural ice. Natural ice thickness may be augmented if site-specific conditions (e.g., water depth) are sufficient to protect fish habitat. The determination of whether conditions are sufficient should consider whether increased ice thickness is likely to:

- cause freezedown into gravels used for spawning or overwintering,
- cause bed scouring that disturbs gravels used for spawning or overwintering,
- excessively reduce the quality or volume of overwintering habitat, or
- adversely alter stream flow patterns above or below the crossing.

4) Augmentation includes adding ice to the surface or removing snow to increase freezing depths.

5) Fish incubation can occur in gravels under channels that have no surface water during some seasons on some sites (for example, along the Toklat River and at the mouth of the Delta River). Winter travel that disturbs gravels on these dry sloughs may adversely impact incubating fish.

Ice crossing research priorities. Previous discussions have covered most of this topic. Steve C. added that the importance of near-term research on ice bridging will depend on how restrictive new regulations are. He said one approach would be to construct an ice bridge under worst-case conditions and try to cause impacts like freezedown and scouring. Jim D. said that some members of the public had asked him about using "freeze vials" for studying freezing, but ADF&G hasn't used them. If used, they would have to be located in areas fish are using. There are technical difficulties in using and retrieving freeze vials, and thermometers could be used instead. Steve C. added that freezedown is only an issue if there is no water flowing on top of the gravel.

UPWELLING RECOMMENDATIONS

The Committee discussed whether additional guidelines are needed for upwelling areas beyond the guidelines on ice bridging and the standard best management practices.

Jim D. noted that exact upwelling locations can move from year to year and may be ephemeral in places. Upwellings evident in May along the mainstem of the Tanana River aren't visible in June due to higher water levels, and we don't know if the upwelling changes. An upwelling visited in August, 1999 was dry in June, 2000. An area with a stain in the October BFC photos and seen by ADF&G in May wasn't visible in the June sampling by ADF&G. We say upwellings are important, but with the exception of a few known areas like Bluff Cabin Slough, we don't know where they are. On the Tanana River in Louis Barton's study area, you might be able to overlay his data, the fall spawning surveys, and the upwelling photos to try to find some consistent areas.

John F. agreed, saying that upwellings are like aufeis areas – they vary. Upwellings vary depending on where the regional groundwater occurs at a given time and its interaction with the local and region geology.

Torre suggested defining upwellings to refer to known upwellings in fall salmon spawning areas and treating those separately. Steve C. suggested using the Five-year Schedule of Timber Sales to identify current upwelling areas.

Marty F. asked what different practices would be recommended near upwelling areas other than ice crossings. Bob O. asked whether these areas would be buffered.

Jim D. said that there are two types of upwellings – ones with high dissolved oxygen (DO) that originate near the surface, and ones with low DO, low volume, and warmer temperatures. He also recalled that at the meeting where Jacqueline LaPerriere made her presentation on hyporheic zones, that Jim Reynolds asked whether forestry activities could affect dissolved organic matter in these flows. She responded that she didn't know of any likely effects.

Bob O. said that harvesting decreases transpiration and can increase discharge from small watersheds. Part of the issue is scale – will a 40-ac sale alter the hydrologic regime? It's hard to imagine. Trees in this area are shallow-rooted and rainfall is low. Much of the annual runoff occurs while the ground is frozen. The big concern for harvesting is stream crossings. John F. agreed.

Jim D. said that the Providence timber sale and Carla Lake fire areas were evident from the river be warm dry winds and dead trees.

Richard M. added that some upwellings are obvious, but many aren't. Upwelling zones are dynamic and important.

John F. asked whether we are limiting "upwellings" to local inflow versus regional.

Jim D. said that his only recommendation is to be a bit more careful with cumulative effects in the area of upwellings because there are more fish involved. Ice crossing guidelines take care of the main issue.

Bob O. stated that cumulative impacts apply to all issues. If there is a multiplication of the extent of activities, the standards should be reviewed again.

Steve C. said that cumulative effects go beyond buffers – you have to look at how you affect recharge areas in big watersheds. Torre asked what the frame of reference is for cumulative impacts. John F. said that for cumulative effects you need to be alert to potential effects upstream and downstream near upwellings.

Torre asked about buffers for upwellings near harvest activities. For example, could snow blowing off harvested areas affect freezedown in upwellings? Bob O. responded that for glacial waters **C6** covers the opportunity for buffering upwellings on a site by site basis where managers can consider specifics. He said we have no reason for recommending buffers on all the sites. Buffers are recommended for all other stream types. Jim D. asked whether managers will have time to consider specifics on these sites. Steve C. said that there is no known hydrologic link between on-shore activities and effects on these sites. Bob O. noted that knowledge can change and that it's better to leave the guideline flexible to allow for new information. Jim D. agreed to leave the guidelines as they are pending discussion of overall buffer issues later in the meeting.

The committee came to the following agreement after discussion: *(Please check wording)*

C27 After considering information on upwellings, adding ice crossing guidelines, and recognizing the self-limiting ability to build ice crossings near upwellings due to open water, the Committee did not recommend other guidelines for upwelling areas.

STREAM CLASSIFICATION SYSTEM AND BUFFER RECOMMENDATION REVIEW

Jim D. noted that the Little Gerstle River should be deleted from the list of examples of Class IV (other surface waters) since it has fish. The group agreed to delete it from the list.

The committee reviewed the draft classification system. Marty summarized the groups of stream types subject to different recommendations by the committee. The only recommendations that differ based on stream type are the buffer recommendations. These recommendations fall into five groups:

IA – Glacial main and side channels	Buffer required for site-specific conditions only
IB – Glacial backwater slough IIC – Non-glacial backwater slough	66' min, increase to maintain natural shading
IIA – Non-glacial groundwater streams IIB – Non-glacial runoff streams III – Lakes	66' min., increase to prevent sedimentation from
IID – Non-glacial lake and wetland outlets	66' min.
IV – Other surface waters	No buffers required; standard BMPs apply

The discussion centered on the appropriate classification and guidelines for class IA, the glacial main and side channels.

Bob O. said that some non-glacial rivers with high flow and active erosion act like type IA streams in terms of erosion and use of LWD and should be included in this type. On the other hand, small glacial rivers like the Little Gerstle have tree roots down to the water level that stabilize the bank, and LWD is important. These glacial streams should have buffers.

Jim D. noted that Bob Burrows believed that glacial waters are radically different from non-glacial streams in terms of their hydrology. However, Jim D. said that the glacial hydrology is not necessarily the most important factor for fish. Lumping all streams with glacial sources into one type is difficult – their hydrology and the roles of wood and shade differ widely.

Jim F. said that he doesn't think that the assumption on the scale of harvest is appropriate for the design of a water body classification system and riparian management standards. Bob O. responded that vegetation isn't stabilizing the big rivers and that so much LWD is going in that partial removal won't affect the river.

Jim D. said that based on four sample periods from the Tanana River fish habitat study and the literature review, he can no longer support **C6** and **C9** on glacial rivers. He believes that bank erosion is controlled by vegetation. Vegetation is not controlling erosion on the mainstem, but contributes to bank stability either through forest vegetation growing on the bank or LWD armoring the bank after it fell in. The role of wood in the mainstem of the Tanana River is formation of channels, sloughs, and islands, and this role is important. He said we don't know how much timber can be taken without effect on LWD in these systems. Torre added that sweepers help armor cut banks. Jim D. responded that sweepers may provide important fish habitat in these systems.

Bob O. agreed that wood is important – this is a question of cumulative impact. A buffer isn't needed along the whole Tanana River to protect the system, but it isn't known where the cutoff level is. He is not concerned that the current level of effect from harvest on LWD will affect fish habitat. Steve C. stated that most wood that falls in the Tanana River is transported.

Marty asked how bank stabilization in the Tanana affects fish habitat. Jim D. responded that more resistant banks result in fewer, deeper channels that provide better winter habitat for resident fish. Changes in bank vegetation could change the meander rate.

Jim F. said that at Surprise Side sloughs many banks were held in place by vegetation. Without the vegetation you would see bank erosion that would result in wider, shallower channels. The scale of impact on the overall system is unknown. He hasn't seen the same kind of vegetative bank stabilization on the mainstem of the Tanana.

Jim D. said that it isn't a problem if the river takes the bank and trees fall in – this will just create a bar downstream. Big wood is needed to create bars. Log jams all have at least some large pieces of wood, as well as many smaller pieces that together make the equivalent of a big root

wad. Bob O. agreed, and also noted that there are scour pools created on the upstream side of root wads.

Fred Dean asked whether the Committee could say buffers are not needed where the river is large enough that it isn't controlled by local wood.

Jim D. stated that root wads without the trunk attached move downstream more easily and don't provide armoring.

Torre said that glacial rivers from the Alaska Range form big braided channels because of movement, flashy hydrology, unstable banks, and shallow rooting. These are different from meandering systems where erosion sites are localized. Headwater glacial streams are smaller, higher gradient, and may be bedrock-controlled.

Jim F. said that in the Tongass National Forest, floodplain (FP) and glacial outwash (GO) channels are grouped and given the highest level of protection. The USFS has data documenting the importance of scour pools as fish habitat in glacial outwash channels. Marty asked how the TNF glacial channels which are shorter and steeper compare to long glacial rivers in the Interior. In the short channels it is easier to significantly affect the recruitment pool for LWD.

Jim D. asked whether the Porcupine River looks like a glacial stream. Fred D. and Bob O. responded that it is very muddy, and has high loess bluffs with high vegetation. Erosion occurs largely on tall banks where the vegetation occurs about 8-10' above the surface of the water. Bob O. reported that Doug Hanson of TCC said that the Porcupine operated more like a glacial river where erosion is controlled by soil and water levels rather than vegetation. He said that the size of the river is more important than whether it is glacial or not. Timber along the Porcupine is all in narrow stringers that would largely fall within 66' of the river.

Jim D. said that in the Providence timber sale and Carla Lake fire area, harvesting, wildfire, and windthrow all caused openings. He said the vegetative mat along the riverbank in this area is more overhung in places without canopy removal, but he didn't know if that was because of harvesting or because that's what it looks like in an area that has big spruce.

Bob O. asked if buffers should be considered in dynamic reaches if these reaches provide a disproportionate amount of the LWD in the river system. He reiterated that preliminary data from the river dynamic study showed that in a test reach, 42% of the LWD came from 15% of the area that is forested with large-diameter spruce. White spruce may be more important LWD than cottonwood because of longer residence time in the river. Steve C. said that if maintenance of LWD system-wide is the goal, that the guidelines should set a percentage of forested bank to be retained. Jim D. said that if we can identify how much wood is going in to the system, we could identify how much forested bank would be needed to maintain the average, assuming the river is in relative equilibrium with respect to LWD.

Torre asked where buffers are measured from. Marty and Jim D. responded that it is from the ordinary high water mark (OHWM), which is defined in the regulations. Torre noted that they

use the 2-year floodplain. Jim D. responded that in practice the OHWM is similar to the 2-year floodplain. Torre noted that limit of alder-willow vegetation is a close approximation.

Jim F. said that a site-specific assessment of the need for a buffer on glacial streams should be based on the size of the trees, availability of similar wood in the vicinity, and the likelihood that the riverbank trees would be recruited as LWD.

Steve C. said that we need to know more about how fast wood moves through systems like the Tanana. Jim F. added that we also need to know how fast the banks are eroding. Steve C. said he believes that there are typically short periods of channel instability followed by long stable periods at any given site. He said that you can't identify site-specific LWD recruitment areas for contribution to the overall river system. The buffer decision should be on the basis of benefits to fish habitat.

Jim F. said that the reason for leaving wood in big rivers is primarily for its contribution to stream morphology, not directly fish habitat. Jim D. added that wood isn't contributing to fish habitat locally, but at the level of the morphology of the whole system. It provides rearing areas for food fish such as chubs and suckers, affects channel morphology, and changes flows at specific sites (e.g., by maintaining fewer, deeper channels). Bob O. said that the literature review backs up the role of wood in channel morphology. Jim D. noted that channel morphology is one of the habitat components listed in the Forest Practices Act. He said that the fish density in individual reaches of the Tanana isn't high, but overall it makes a big contribution to the total fish population.

Steve C. said that it is unknown that LWD is a limiting factor to fish in systems like the Tanana.

The committee discussed options for buffers on dynamic rivers. The main points were that not enough is known to set a threshhold below which harvesting along the bank could occur without decreasing LWD sources to a degree that adversely affects fish habitat. Some members felt that too little harvesting occurs to significantly impact the supply of LWD. Others felt that the current level of LWD should be maintained. The width of buffers in dynamic reaches could differ from that in other reaches since the main purpose is to maintain a long-term supply of LWD rather than bank stability or shade.

The Committee agreed to the following consensus points.

C28 Different reaches of streams and the banks of the same reach can be classified differently. Where multiple channels occur, each channel is classified separately.

C29 With respect to dynamic reaches of large rivers, the committee agreed to the following points.

- Large woody debris affects the morphology of dynamic river systems (e.g., development of bars, side channels, sloughs).
- We do not know how much LWD input must be maintained to sustain the channel morphology function in these systems.

- The Tanana River Dynamics project underway will help provide information for one river system -- the Tanana River. Nearly all commercial harvesting in Region III is currently taking place in the Tanana River Basin. For the Tanana River, this study will provide data on the average annual input of LWD, the amount that comes from each forest type, and the proportion of important forest types that are open to harvesting.
- Until more information is available on LWD in dynamic rivers, the committee recommends the following interim standard: Require a buffer but allow exceptions where a buffer is not needed to provide adequate protection of fish habitat, for example in dynamic reaches of large rivers. This is the current FRPA approach.

The committee revised the draft stream classification system to consolidate stream types with similar management standards. The revised system and associated buffer recommendations follows.

Region III Stream Classification System and Recommended Buffers Revised Draft – June 26, 2000 (C3am)		
Waterbody class	**Recommendations**	**Notes**
All types	**C21** Stream buffers should be measured from the ordinary high water mark (OHWM) regardless of the vegetative cover type within the buffer zone.	**C7** The need for buffers should be reevaluated if there is a significant increase in the level of harvesting along glacial rivers.
Class A – Backwater sloughs	**C11** A minimum 66' no-cut buffer is needed to provide large woody debris and shade on Class A waters. To avoid reducing natural shading, the width should be increased as needed based on stand height, vegetative composition, and susceptibility to windthrow. Natural shade conditions vary based on tree height, tree species and understory vegetation, and bank geometry.	**C11a** The *66' r*ecommended minimum buffer width is an approximation of 2/3 maximum tree height to provide large woody debris, and of the distance needed to provide shade at Region III latitudes. It is also one chain, which is an easy measurement to apply in the field. **C22** Shading is a function of tree height, sun angle, and latitude. At latitude 65° N (the latitude of Fairbanks), the following shade distances occur: Shading distance by date Average June 21 July 18 Tree height (max. sun angle) (warmest stream

		temp. in Interior 70 feet 62 feet 67 feet 80 feet 72 feet 77 feet.

Class B – Other streams with banks controlled by vegetation or bedrock, and lakes	**C12am** No-cut buffers are needed for Class B waters. Buffer design for these classes should incorporate concerns for large woody debris, shade, bank stability, channel morphology, and prevention of sedimentation. Shade provides cover for small fish along banks and controls temperature increases in sloughs and other waters with slow flows. **C14am** No-cut buffers on Class B waters should be a minimum of 66'. The width may be increased when needed to control sedimentation from steep slopes adjacent to the water bodies.	**C13am** A 60'-70' buffer width is adequate to provide large woody debris in these buffers based on most debris coming from within a distance from the bank equal to 2/3 of maximum tree height. More information is needed to determine the appropriate buffer width to prevent sedimentation or introduction of organic leachate from steep slopes adjacent to these water bodies. Few riparian areas along these water bodies have steep slopes.

Class C – Streams with banks not controlled by vegetation or bedrock (dynamic stream reaches).	**C6am** A buffer is needed to provide LWD to maintain channel morphology on Class C waters. Allow exceptions where a buffer is not needed to provide adequate protection of fish habitat, for example in dynamic reaches of large rivers. This is the current FRPA Region III approach.	**C8am** Additional research is needed on the role of LWD in Class C waters.

HANDOUTS

- Draft agenda and remaining steps
- Draft minutes from May 4, 2000 (meeting #10)
- Examples of waterbodies by class – Region III
- Region III Stream Classification Committee – Importance Matrix of Water Body Types and FRPA Habitat Components
- Region III recommendations for buffers to protect fish habitat and water quality, July 21, 1999
- Region III Riparian Committee Consensus points on non-buffer issues, July 21, 1999
- 2p handout from Freeman on committee summarizing recommendations by waterbody class
- Graphics for Prince William Sound groundwater study from Johnny Mendez
- Sample web page for Geohydrological Investigations – Fort Wainwright, Alaska (www.uaf.edu/water/projects/ftww/ftww.html)
- Buffer Strip Design – 2p draft introduction to literature review section by Jim Ferguson
- Tongass Land Management Plan, 1997 – Road standards and guidelines; Riparian – Forest-wide Standards and Guidelines. pp 4-53 to 4-73.
- M.D. Bryant and J.R. Sedell. 1995. Riparian Foreststst, Wood in the Water, and Fish Habitat Complexity. pp. 202-224 in Armantrout, Neil B., editor. Condition of the World's Aquatic Habitats. Proceedings of the World Fisheries Congress, Theme 1. American Fisheries Society.

TO DO:

Lit review leaders – send draft introductory sections to Marty by 7/7
Marty – Distribute introductory sections to committee as received
All – Submit comments to introduction authors and co-chairs by 7/21 (note: Jim D.'s comments will be by 7/28 due to research schedule)
All – Review draft minutes and e-mail corrections to Marty by 7/26

NEXT MEETING: FRIDAY, JULY 28

- Review final literature review document
- Finish review of the package of recommendations
  - Water body classification system and key
  - Buffer recommendations
  - Other recommendations (non-buffers)

Region III Forest Practices Science/Technical Committee
MINUTES – Meeting #12; July 28, 2000
DNR Large Conference Room, Fairbanks, AK

Attendance

Steve Clautice	John Fox
Mike Doxey	Jim Durst
Doug Hanson (for Ott)	Steve Joslin
Jim Ferguson	Chris Maisch
Deanne Pinney	Marty Welbourn Freeman

Visitors
Fred Dean, Alaska Boreal Forest Council
Richard McCaffrey, Alaska Boreal Forest Council

Note: Handouts referenced in the minutes are available from either co-chair.

LITERATURE REVIEW

Marty handed out a complete draft of the annotated bibliography, including the master list of references. John F. also handed out a paper on biological effects of river ice that will be added to his section. Bob O. and Jim D. still have a few edits to go on the introductions to their sections, but otherwise the document is final. When complete, Marty will distribute copies to the Region III Committee, the Board of Forestry, the Tanana Valley State Forest Citizens Advisory Committee, and the resource agencies, and it will be available through the DOF web site. An announcement of its availability will be sent to everyone on the Region III mailing list as well.

COMMITTEE TITLE

The committee agreed to use the title "Region III Science/Technical Committee" to parallel the work done in Region I and to encompass both the stream classification work and the review of riparian management standards that the committee has done.

WATERBODY CLASSIFICATION SYSTEM

Chris M. said that he was not comfortable lumping glacial waters like the Tanana River with non-glacial waters like the Porcupine River, and was concerned that Consensus points **C6** and **C9** were dropped at the previous meeting. He stressed that the classification and buffer recommendations should reflect the matrix of habitat components and likelihood of impacts from forest operations. He noted that much is still unknown about glacial systems.

Jim D. said that he believes it is a bigger stretch to combine the Tanana River and Delta River – both are glacial, but there is wide variability in their conditions and uses. Steve J. agreed that there is a big difference between the Delta and Tanana rivers.

John F. noted that the changes in the original classification system that were made at the last meeting were driven by the discussion of bank stability and LWD. He also noted that the Committee agreed that waterbody classification should be done by reach. He also said that in some ways he preferred the original classification because it made better intuitive sense.

Chris M. noted that bank stability is only one of the ten habitat components. He also agreed that LWD and channel morphology are important to glacial waters, but that the other components rate low for sensitivity to forestry activities in glacial waters.

Jim D. said that the low ranking was based on the assumption of a continued low level of harvest, which could change. However, several committee members disagreed, stating that it was also based on considering whether there would be likely impact if harvesting occurred (Deanne P., Chris M., Steve C.).

John F. noted that the discussion on glacial waters had largely been in the context of the Tanana River or a "typical" glacial river.

Chris M. recommended keeping glacial waters separate – he doesn't want rivers like the Koyukuk or Porcupine combined with glacial waters.

Deanne P. noted that on the original matrix the Committee agreed that habitat components 1 (LWD) and 4-8 (temperature, flow, water quality, nutrients, and food) were the most important, but the current discussion is emphasizing components 2 (bank stability) and 3 (channel morphology).

John F. said that classifying waters by reaches, could address the concerns about how to treat dynamic reaches of non-glacial waters. Steve J. added that he would be uncomfortable if all reaches of the Tanana were classified the same.

Chris M. expressed concern that under the revised classification system there would be frequent disagreement in the field over whether or not vegetation is controlling the bank on the big rivers. He added that the literature doesn't show that vegetation is important in controlling the banks of the large rivers. Jim D. agreed that in the dynamic reaches the energetics of the water is a controlling factor.

[The Committee took a break and Jim Ferguson was added by phone at this point.]

Jim D. said that components 2 and 3 on the matrix are also important and suggested revising the matrix to say that #1 and #4-8 are most "directly" important.

Marty WF summarized the initial discussion, saying that the Committee raised two questions –
1) Is the glacial category too broad – do all glacial waters act the same regardless of size?
2) Do some dynamic reaches of clearwater streams act more like dynamic reaches of glacial rivers than like other clearwater streams?

She added that we don't have to combine the three types under discussion (dynamic reaches of glacial waters, dynamic reaches of non-glacial waters, and stable reaches of glacial waters) into two classes.

Jim D. said that channel morphology drives velocity, intergravel flow, and overwintering and spawning habitat -- it is highly important. Chris M. asked what fish are affected by the changes in morphology and LWD in the glacial waters. Jim D. responded that they are important to whitefish, grayling, pike, and burbot for rearing and overwintering, and for fall chum spawning. Chris M. said that there isn't a high risk of influence from forest management actions in these areas.

John F. said that Torre J. had made the point that classic braided channels coming out of the mountains such as the Gerstle and lower Delta are different from other glacial waters. Marty WF pointed out that these are mostly streams without anadromous or high value resident fish except in their lowest reaches.

Jim F. asked whether the potential for influence from forestry would change if harvesting increased. Steve C. answered that in glacial rivers, LWD isn't the primary influence on channel morphology – it is the bed load which isn't controlled by wood. John F. added that channel morphology is changing constantly regardless of wood.

Jim D. said that you need big wood or large amounts of smaller wood to form river bars. Steve C. disagreed, stating that wood hangs up on the bars, but isn't necessarily forming the bars. Jim D. disagreed, stating that studies on the Queets River (WA) show wood forms bars, and the importance of large key pieces of LWD. Steve C. responded that the wood in the Queets is much larger.

Jim F. said that the dominant agent of bar formation is bed load; that LWD does play an important role, but we don't know how to compare the role of LWD with that of bed load. He added that because we don't know, we should be conservative.

Steve J. said that 4-6,000 years ago the Tanana River Basin was grassland even along the rivers. Mike D. agreed, but said we don't know if fish were in the rivers then.

John F. said that in the matrix, the role of channel morphology in dynamic glacial waters would be M for importance and L for risk relative to other components in glacial waters. When dealing with ordinal variables such as these, rating everything as high importance is meaningless.

Jim D. said that in a large dynamic river, spawning sites are controlled by channel morphology. John F. responded that dynamic reaches are changing by definition, and that fish deal with the changes. The changing channels in dynamic reaches don't necessarily gain or lose habitat, but the location changes and fish move with the changes.

Following this discussion, the Committee agreed to the following points.

C29a "Dynamic reaches" are defined as reaches or channels with active channel movement, shifting bed load, and eroding banks, usually associated with the floodplains of large river systems.

C3am The matrix was amended to split glacial waters into dynamic and stable reaches, and to add a type for dynamic reaches in non-glacial waters as follows.

Type	1-LWD	2-bank	3-morph.	4-temp.	5-flow**	6-WQ	7-nutrients	8-food	9-gravel	10-sun
A-glacial/dynamic	**H** L-M	L L	M L	**H** L	**H** L	**H** L	**H** L	**H** L	L L	L L
H-glacial/stable	**H** M	**H** **M-H**	**H** M	**H** L	**H** L	**H** L	**H** L	**H** L	L L	M L
I-non-glacial/dynamic	**H** **M-H***	**H** L-M	**H** M	**H** L	**H** L	**H** L-M	**H** L	**H** L-M	**H** L	**H** L

*The likelihood of impacts from forestry activities varies based on the size of the river, i.e., the likelihood of impacts is lower for larger rivers.

**Likelihood of impact from forestry activities is low in these types except for potential impacts from ice bridging. This footnote applies to the other stream types as well.

BUFFER RECOMMENDATIONS

Steve C. said that the recommendation for the width of buffers to provide LWD should be based on the height to usable wood. He said that a 100' tree height (e.g., see **C11a**) is rarely seen in Region III, and asked what the target size is for LWD. Jim D. responded that it is down to 4" diameter, what he described as a "boat pole". Others concurred.

Jim D. asked what the average spacing is for trees, and noted that 66' buffers in Region I are usually 1-3 trees thick. Steve C. and Chris M. responded that there would be more trees in the same distance in Region III.

Steve C. said that the typical average height of the dominant trees is 70-80'. In such trees, a 4" diameter would be reached at about 50' and that 50-60' would capture more than two-thirds of the dominant tree height. Based on the information from other areas and the definition of LWD, 50-60' would maintain a supply of LWD in Region III stands.

Jim D. added that in backwater sloughs, smaller wood also provides fish habitat since it is not washed away by rapid flow.

The Committee agreed to the following changes:

C30 – Large woody debris is defined as pieces of wood ≥ 4" in diameter. **Note:** In Type A waters (backwater sloughs), smaller diameter wood also provides fish habitat because these waters lack sufficient flow to transport wood out of the waterbody quickly.

Amend **C11am** as follows: **C11am2** -- To maintain the supply of LWD, a buffer of approximately 50-60' from the OHWM is needed based on average dominant tree heights of 70-80', and a typical height to a 4" top in these trees of about 50'. Based on studies in other areas, most LWD comes from within two-thirds of average tree height.

Delete **C13am**. **[**A 60'-70' buffer width is adequate to provide large woody debris in these buffers based on most debris coming from within a distance from the bank equal to 2/3 of maximum tree height.**]**

Windthrow. Jim D. asked how important windthrow is in Region III buffers. Chris M. responded that Bob Ott had studied windthrow a lot in southeast Alaska and had initiated buffer studies in the Tanana Basin. There has been no significant blowdown in the first five years of study on the three test buffers. He said that Ott believes it is not a big factor in most of Interior Alaska, but may affect local areas like the Delta area.

Steve J. said that blowdown can enhance fish habitat by providing LWD in small streams. Jim D. responded that buffers can be a short- or long-term source of LWD depending on the orientation relative to the wind direction. Buffers are more resilient if the wind comes from the stream side, rather than the harvest unit side. Resilience depends on tree rotting and the degree of wind resistance developed by the trees prior to a major wind event.

Steve J. concurred that the Delta area has high winds. He noted that some 100' strips left between cutting units have blown down. He said that the Delta winds usually blow down the Tanana River.

Jim F. stated that the best way to decrease windthrow is to place the cutting unit well to begin with. Feathering the edges of the cutting unit hasn't been effective. He said that the Tongass National Forest uses a tree height buffer as the minimum and then increases the width where necessary for wind resistance. The USFS recognizes that some blowdown is likely and allows salvage in blowdown areas.

Chris M. noted that in the interior wind sometimes results in bole breakage rather than windthrow, especially in the winter.

The Committee agreed that the following recommendation should apply to all waterbody types.

C31 – Windthrow is not a major risk in most areas of Region III. In sites where high winds are common, buffers should be designed to be windfirm by considering wind direction, orientation of harvest units, canopy size, and tree species.

Buffers on glacial and dynamic reaches. The Committee discussed appropriate riparian management standards for dynamic and stable reaches of glacial waters, and for dynamic reaches of non-glacial streams.

They agreed to revised the waterbody classification system as follows. This amends **C3** to add **C3b**:

Waters with anadromous or high value resident fish
Type A -- Backwater sloughs
Type B -- Stable reaches or channels, and lakes
    Subtype B1 -- Non-glacial waters
    Subtype B2 -- Glacial waters
Type C -- Dynamic reaches or channels
    Subtype C1 – Non-glacial waters
    Subtype C2 – Glacial waters
Waters without anadromous or high value resident fish -- Other surface waters

C32 No-cut buffers on Subtype B2 waters should be a minimum of 50-60' to provide LWD to these reaches.

Examples of Subtype C1 waters include dynamic reaches in the Koyukuk, Porcupine, Anvik, and Kateel rivers. Unlike Subtype C2 waters, these reaches usually are connected to downstream fish-bearing reaches that are stable and not heavily sedimented. While the channels in subtype C1 are actively shifting, they typically do not move as rapidly as those in Subtype C2 due to lower bed loads. For Subtype C1 (dynamic reaches in non-glacial waters), the Committee agreed that buffers are needed for LWD, bank stability, channel morphology, water quality, and food sources. The width needed to provide for LWD should also provide the other functions.

For Subtype C1, the Committee reached the following consensus.

C33 No-cut buffers on Subtype C1 waters should be a minimum of 50-60' to provide LWD to these reaches. Because of high fish habitat values, some Subtype C1 waters may merit consideration for wider buffers on a site by site basis, but the S/TC does not have a basis for generic recommendations for wider buffers.

Dynamic reaches of glacial waters. The Committee discussed appropriate standards for Subtype C2 (dynamic reaches of glacial waters) at length. The core of the discussion was whether or not buffers are needed to protect the supply of LWD to Subtype C2 systems, or whether the natural input of LWD from erosion is so great that a buffer isn't needed. Also, whether or not adequate sources of LWD existed without the need for buffers.

The Committee discussed the following options for addressing buffer issues in this subtype.

1. Require a minimum buffer of 50-60' based on the width needed for local recruitment of LWD.
2. Require a wider buffer to maintain a long-term supply of LWD to the river system, including downriver reaches.
3. Maintain a threshold of tree cover to provide a long-term supply of LWD to the river system while allowing some harvest along the banks.
4. Set a goal of maintaining a long-term supply of LWD to the river system, identify the options, and leave the choice open to the Board of Forestry and implementation group.
5. Defer recommendations on buffers for this waterbody type until the level of harvest increases.
6. Agree to disagree (no consensus).

The S/TC did not reach consensus on whether or not buffers are needed to provide adequate protection for fish habitat on Subtype C2 waters. [Note: the Committee agreed that buffers are not required to protect water quality in these reaches. The Committee considered the following options.] There was no agreement on how much LWD is needed to maintain the habitat functions of Subtype C2 reaches and downstream reaches in the same river system.

Jim D. said that fish do use these reaches for overwintering – they contain deep pools for grayling, burbot, and pike. Jim F. added that LWD recruited in Subtype C2 reaches provides wood to downstream Subtype B2 reaches (stable reaches in glacial waters).

Steve C. said that if recruitment of LWD is the issue, that buffers don't address the issue. Channel movement can eliminate buffers. He asked what supply of LWD is adequate, and stated that information linking LWD to effects on channel morphology and then to effects on fish habitat in this type of reach is weak.

Jim D. disagreed and said that it is clear that LWD has a significant influence on channel morphology, and directly provides habitat for chub and other prey species. It also plays a role in overwinter habitat.

Steve C. noted that in winter the water level in these reaches drops and most of the LWD is out of the water, not providing habitat. Jim D. responded that prey species grown in the summer in habitat provided by LWD still provide food in the winter. He said that Nick Hughes' description of the role of the Tanana River for fish habitat is that fish aren't in the Tanana in high densities, but they are ubiquitous – the Tanana is important because there is a lot of it.

Jim D. said that wildlife habitat hadn't yet been considered in the buffer discussion, nor the impact of potential federal actions based on weak salmon runs. Marty WF reiterated that the charge of the S/TC is to recommend standards needed to provide adequate protection of fish habitat and water quality, since the FRPA doesn't have authority to regulate wildlife habitat on private land. Wildlife habitat issues on state land may be considered by the implementation group later in the process.

Chris M. disagreed with the assessment of the impact of LWD on fish habitat. He also asked how you could maintain a long-term supply of LWD in these dynamic systems. Jim F. responded that the Tongass National Forest prohibits logging in the active floodplain. Chris M. responded that the Tongass waters are different than those in Region III, however Jim F. said that the waters described by Sedell in some Lower 48 studies are similar. Steve C. stated that the standards in the Tongass are the result of political discussions as well as scientific input.

Jim D. said that options 4. and 5. in the list above are not viable given the Committee's charge. The Committee also discussed the difficulty of implementing option 3. across different land ownerships.

C34 For C2 waters, the S/TC agreed to the following points.

1. There is no consensus on the need for a buffer to supply adequate LWD to maintain fish habitat in dynamic reaches or channels of glacial waters.

2. LWD typically has short residence time at the source site – it is usually transported downriver unless lodged in an island or river bar.

3. More information of the input of LWD will be available from the Tanana River Dynamics study that is currently in progress (12-18 months).

4. Most LWD in these reaches and channels is recruited by erosion rather than windthrow.

5. The main role of LWD in these reaches and channels is in channel morphology, particularly the formation of river bars and islands.

S/TC members described the following main viewpoints

Position A: Forest operators won't significantly impact the supply of LWD in these river systems based on the amount of LWD input from natural erosion and the limited availability of areas for harvesting. Therefore, no buffer should be required. Buffers may be used if needed to provide other functions on a site-by-site basis.

Position B: Information on the necessary level of LWD is insufficient to determine whether harvesting adversely impacts LWD supply. Because of this uncertainty, and because of the importance of LWD to fish habitat ...

Position B1: ... a buffer should be required of at least 50-60' based on the width needed for local recruitment of LWD.

Position B2: ... a threshold should be set for the proportion of streamside forest vegetation that must be maintained at all times. The extent of forest cover should be monitored, and the threshold amended as appropriate as new information becomes available.

Handouts

- Agenda
- Power, G., R. Cunjak, J. Flannagan, and C. Katopodis. 1993. Biological effects of river ice. pp. 97-127 In Prowse, T. D., and N. C. Gridley, editors. Environmental aspects of river ice. Environment Canada, National Hydrology Research Institute Science Report No. 5.
- Draft annotated bibliography
- Revised draft waterbody classification key (6/26/00)
- Revised draft list of examples by waterbody type (6/26/00)
- Revised buffer recommendation chart (6/26/00)
- Revised non-buffer recommendation chart (6/26/00)

Implementation Group documents

Region III Forest Practices Implementation Group – Contact List

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Bob Zachel	455-6164	n/a	n/a	Alaska Birch Works P.O. Box 83244 Fairbanks, Alaska 99708

SUMMARY OF REGION III FRPA RECOMMENDATIONS FROM IMPLEMENTATION GROUP (IG-C22) AND BOF

November 8, 2000

Background. The Region III FRPA Implementation Group met in October and November to

- figure out how to implement the recommendations from the Science & Technical Committee in a feasible manner, and
- draft changes to the Forest Resources and Practices Act and regulations to put the recommendations into effect.

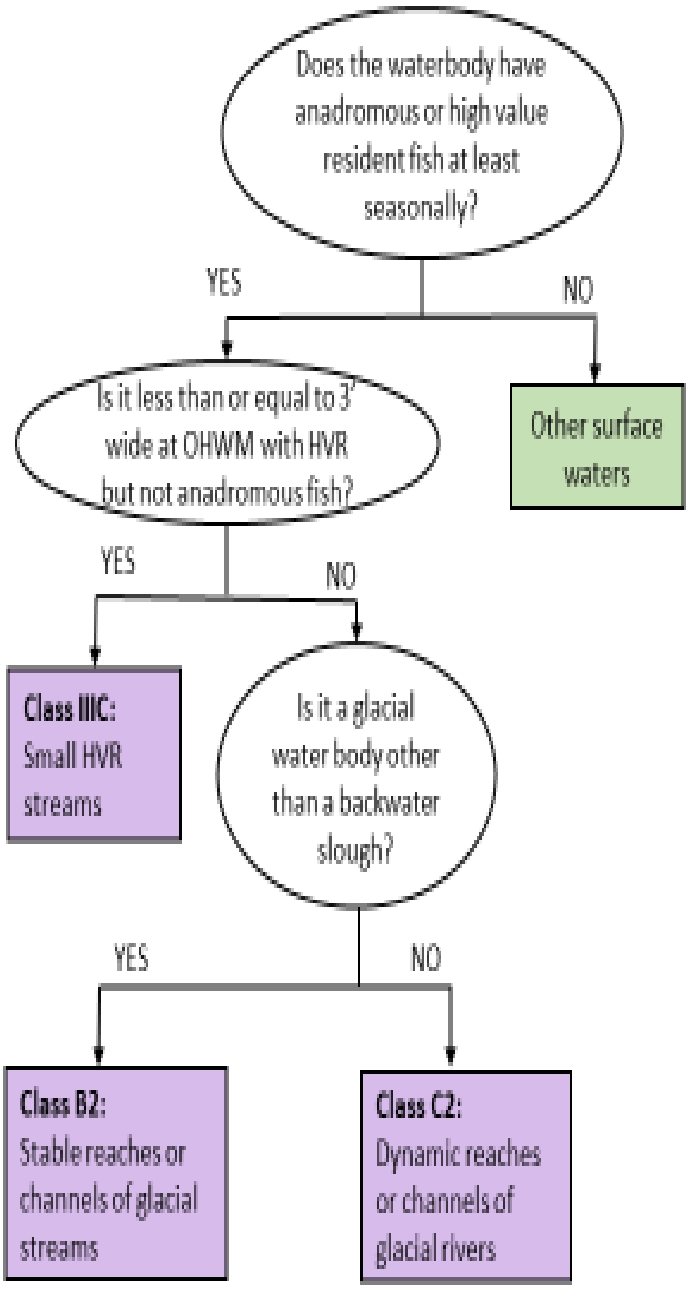
The group included representatives of the resource agencies, the timber and fishing industry, and other groups affected by the forest practices decisions. A list of Implementation Group members is attached.

Recommendations.

Riparian Buffers		
Waterbody type	**Public land**	**Private land**
Type III-A: All backwater sloughs, non-glacial anadromous fish water bodies, and non-glacial high-value resident fish water bodies >3 feet wide at OHWM	▪ 100-foot no-cut riparian zone, except that between 66 feet and 100 feet harvest may occur where consistent with maintenance of important fish and wildlife habitat. ▪ Decisions to harvest within the 66 to 100-foot zone will be made by DNR with the concurrence of ADF&G.	▪ 66-foot no-cut riparian zone.
Type III-B: All other glacial anadromous waters and glacial high value resident fish water bodies	▪ 100-foot riparian zone ▪ 50-foot no-cut zone adjacent to waterbody ▪ 50-foot variable retention zone where up to 50% of the white spruce ≥9 inches dbh may be harvested without requiring a variation.	▪ 66-foot riparian zone ▪ 33-foot no-cut zone adjacent to waterbody ▪ 33-foot variable retention zone where up to 50% of the white spruce ≥9" dbh may be harvested without requiring a variation.
Type III-C: Non-glacial high-value resident fish waters ≤3 feet wide at OHWM	▪ 100-foot riparian zone within which harvesting may occur but must be consistent with maintenance of important fish and wildlife habitat **Note:** These are typically upland streams for which little information is available. DNR and ADF&G will examine this stream type in the field in the summer of 2001 to determine the presence of high value resident fish, overlap with commercial harvest areas, and needs for fish habitat protection. The agencies will then review findings with an STC/IG.	▪ 100-foot riparian zone within which harvesting must be located and designed primarily to protect fish habitat and surface water quality. (status quo) ▪ See note under public land re field checks

Other issues	
Definitions	Added statutory definitions for ▪ glacial water body ▪ non-glacial water body ▪ Type III-A, III-B, and III-C Revise regulatory definitions for ▪ "commercial forest operation" and "commercial timber harvest" in Region III from 10 MBF to 30 MBF to allow continued small-scale harvest along rivers in remote areas without requiring DPO ▪ "lake or pond" in Region III to include lakes with high value resident fish that don't have an inlet or outlet "permanent road or crossing structure" and "temporary road or crossing structure" to set the break at 5 years and eliminate the gap between the definitions of permanent and temporary crossings. This affects only the sizing of culverts. Consider moving the definition of regions from the regulations to the statute to simplify and clarify the description of regions in the Act.
Consistency	Several sections updated to make references to the riparian standards consistent with the recommended buffers: AS 41.17.950 Definition of riparian area for Region III 11 AAC 95.260 Riparian standards 11 AAC 95.265 Classification of surface water bodies
Guidelines for variable retention area in buffers on glacial water bodies	Add to 11 AAC 95.275 Uses Within a Riparian Area ▪ emphasize retention of trees with wildlife habitat benefits ▪ retention trees must be well-dispersed throughout the variable retention area in type III-B buffers. ▪ allow felling from variable retention area into no-cut buffer when necessary to minimize damage to residuals ▪ allow tops to be left within no-cut buffer if treated to minimize risk of insect infestation ▪ require high- and low-marking of all harvest trees within variable retention area
Slope stability standards	Delete slope stability standards for Region III in 11 AAC 95.280
Winter roads	Add water bars to the list of practices that may be used to prevent erosion on winter roads (11 AAC 95.290(g)
Snow bridges and ice crossings	▪ Change "organic debris" to "organic mat" in the regulation on snow ramps and ice bridges to be consistent with definitions ▪ Require review of likely impacts of ice bridges on fish habitat when natural ice thickness will be augmented; factors to be considered are freezedown, bed scouring, volume of aquatic habitat, and stream flow patterns.

Implementation Group members
Marty Welbourn Freeman, DNR co-chair
Jim Ferguson, ADF&G co-chair
Fred Dean, Boreal Forest Council
Jim Durst, ADF&G Habitat & Restoration
Bill Fliris/Jill Klein, Yukon River Drainage Fisheries Assn.
Chris Foley, DEC Air & Water Quality
Nancy Fresco, Northern Alaska Environmental Center
Doug Hanson, Tanana Chiefs Conference
Gary Lee, Doyon, Ltd.
Chris Maisch, DNR Division of Forestry
Jack Phelps, Alaska Forest Association
Chris Stark, Bering Sea Fisheries Assoc.
Bob Zachel, Alaska Birch Works



Implementation Group
Region III
Final Key to Forest Practices Waterbody Classification System
November 8, 2000

Region III Implementation Group
Examples of waterbodies by type November 7, 2000

Note: The following list is intended to provide examples of likely waterbody classifications. Actual classifications will depend on field inspections. Different reaches of streams may be classified differently, based on their fish populations, configuration, and control of stream morphology. In addition, opposite banks of some reaches may be classified differently, e.g., if one bank is controlled by bedrock and the other is actively eroding regardless of vegetative cover.

WATERS WITH ANADROMOUS OR HIGH VALUE RESIDENT FISH POPULATIONS

Type III-A

- **Backwater sloughs.** A backwater slough is a waterbody that has sluggish flow, is warm in summer, and typically is only connected to the main stem or a side channel at one end. A backwater slough carries river current only under high water conditions, and may have only a seasonal connection to the main stem or side channel. **Note:** A number of waterways called "sloughs" on topographic maps are side channels of glacial or non-glacial rivers under this classification system.
  - Totchaket Slough
  - Many unnamed backwaters along the Tanana R. and possibly along the Nenana and Kantishna rivers
  - Unnamed sloughs in the Chena system

Non-glacial high value resident fish waters >3 feet wide and non-glacial anadromous waters. A non-glacial water body" is a water body that does not receive significant surface flow from a glacier under nromal conditions. Significant flow means that there is enough glacial flow to affect the streams sediment load, temperature, and hydrography. For example, the Koyukuk River receives a fraction of its surface flow from a glacier However, the glacial flow is a small portion of the total flow, and doesn't significantly alter the sediment load, temperature, and hydrography of the river. Therefore, the Koyukuk is classified as a non-glacial water body for the purposes of the Forest Resources and Practices Act.

- Richardson Clearwater River (and some unnamed tributaries)
- Fivemile Clearwater River
- Delta Clearwater River
- Julius Creek
- Piledriver Slough
- Lignite Creek
- Chena River
- Salcha River
- Goodpaster River
- Chatanika River
- Shaw Creek
- Hess Creek
- Birch Creek
- Tolovana River
- Goldstream Creek
- Healy L. outlet to Tanana R. (unnamed)
- Connector from Minto L. to Goldstream Cr.
- Medicine L. outlet

- Many unnamed waters in wetland complexes (e.g., in the Lake Minchumina area)
- Birch Lake
- Harding Lake
- Healy Lake
- Medicine Lake
- Volkmar Lake
- Quartz Lake
- Deadman Lake
- George Lake

- Porcupine River
- Anvik River
- Kateel River
- Koyukuk River
- Jim River
- Glacier Creek
- Otter Creek
- Long Creek
- Faith Creek

Type III-B. Glacial high value resident fish waters >3 feet wide and glacial anadromous waters. A "glacial water body" means a water body that receives significant surface flow from a glacier under normal conditions, and includes water bodies that receive a mix of glacial water and water from other sources. Significant flow means that there is enough glacial flow to affect the streams sediment load, temperature, and hydrography.

- Salchaket Slough
- Swan Neck Slough
- Soldier Slough
- Stable reaches in the Tanana, Kuskokwim, and other glacial waters listed in Subtype C2
- Tanana River
- Kuskokwim River
- Yukon River

- Teklanika River
- Toklat River
- Phelan Creek
- Tok River
- Nenana River
- Chisana River
- 17-Mile Slough (Nenana)
- Wood River
- Middle reaches of Toklat River

Type III-C. High value resident fish streams less than or equal to 3' wide at OHWM

Typically these are the upper reaches of streams in upland areas; many are unnamed. Many will be outside areas with commercial forest vegetation. Possibly Rosa Creek. Examples will be identified after field review in summer 2000.

WATERS WITH NO ANADROMOUS OR HIGH VALUE RESIDENT FISH POPULATIONS

Other surface waters

- Black Lake
- Smith Lake
- Acey-Deucey Lake
- Delta River (above lowest mile)

- Robertson River
- upper reaches of Cache Creek
- upper reaches of Caribou Creek
- upper reaches of Spinach Creek

Region III Forest Practices Implementation Group
MEETING #1 MINUTES – October 3-4, 2000
DNR Large Conference Room, Fairbanks, AK

Attendance
Fred Dean, Boreal Forest Council
Jim Durst, ADF&G
Bill Fliris, Yukon River Drainage Fisheries Association
Jim Ferguson, Co-Chair, ADF&G
Chris Foley, ADEC
Marty Welbourn Freeman, Co-Chair, ADNR
Nancy Fresco, Northern Alaska Environmental Center
Doug Hanson, Tanana Chiefs Conference
Gary Lee, Doyon, Ltd.
Chris Maisch, ADNR
Jack Phelps, Alaska Forest Association
Chris Stark, Bering Sea Fisherman's Assn.
Bob Zachel, Alaska Birch Works

Visitors
Dale Haggstrom, ADF&G
Tom Paragi, ADF&G
Mike Doxey, ADF&G (teleconference, part of second day)

Note: Handouts referenced in the minutes are available from either co-chair.

October 3:

Introductions and background

The meeting was called to order at 8:40, with all members except Gary Lee at the table. Gary joined the group at 9 a.m.

Marty gave an introduction, including a brief discussion of the earlier effort in Region I (southeast), and emphasized the value of agency and stakeholder consensus, particularly with respect to making changes in the Forest Resources and Practices Act (FRPA).

Next, Marty discussed some definitions, including "other public" lands, and discussed the applicability of the FRPA. She noted that the FRPA is not generally applicable to native allotments. She also noted that, aside from language requiring the Department of Fish and Game (ADF&G) to work with private landowners on wildlife management issues, there is no language in the FRPA that addresses wildlife on private lands. The intent for riparian areas is the maintenance of fish habitat and water quality. On state lands, wildlife is considered, through some general intent language in the FRPA, through due deference by the Department of Natural Resources (DNR) to ADF&G, and in Forest Land Use Plans prepared for all state sales greater than 10 acres.

At this point, Gary joined the group.
Marty re-stated the three principles that should govern the group's work on FRPA standards for riparian areas and other issues:

- The standards should be workable on the ground;
- The standards should be applicable to FRPA Region III (Interior Alaska north of the Alaska range); and
- The standards should fix a problem in the FRPA and/or regulations that has not been previously addressed.

The Board of Forestry reiterated the four principles highlighted in the "Green Book" for the 1990 revision of the Act, and Marty summarized them for the Implementation Group. They are summarized as:

- "Fairness"
- "No Big Hit"
- "Enforceability", and
- "Professional Management".

Marty then defined high-value resident (HVR) and anadromous fish-bearing water bodies, and noted that on state lands, a water body is assumed to be anadromous if it is cataloged below, and there is no intervening blockage to fish passage. She noted that on state and other public lands, the FRPA sets out a 100-foot riparian area on anadromous and high-value resident streams.

Review of Science and Technical Committee recommendations

After a break, Marty briefly went over the mission and products of the Region III Science and Technical Committee (STC).

Jack asked about the protection of HVR water bodies on private lands in Region III [In Region I, for example, high-value resident water bodies are given the same protection as anadromous streams on public lands; on private lands there, high-value resident water bodies are not specifically singled out for protection].

Marty replied that in Region III, due to the nature of HVR populations, the existence of major stream systems with HVR but no anadromous fish, and the importance of HVR fish to humans (e.g., grayling), the STC agreed that HVR water bodies should be protected on both private and public lands.

It was noted that the water body classification system proposed by the STC is not meant to be global. Rather, it is specific to the implementation of the Forest Practices Act.

The group then discussed how and when the state determines if a water body is fish-bearing, and how advance notification is given of the presence and classification of a water body. On public lands, advance notice is given in the five-year schedule of timber sales, and in FLUPs. On private lands, notice is given in the Detailed Plan of Operation (DPO). Also, the landowner may

request a visit by ADF&G to verify fish presence. The group discussed the issue of finding fish in a water body, including when fish are likely to be present.

Marty summarized the STC-recommended buffers for the different classifications. There was a discussion of the temperature issue, and the role of buffers in shading, including the orientation of a stream (e.g., E-W vs. N-S), and the average height of trees in riparian areas and the degree to which they provide shade. The group agreed that a 70-foot tree height is a conservative figure, and that the actual heights could be less in some areas. The group briefly discussed the role of wood in large river systems.

Chris M., Jim D., and Fred each gave a brief update and summary of their ongoing projects: Chris M. on Tanana River Dynamics, Jim D. on Tanana Basin Fish Habitat Use, and Fred on Upwellings in the Tanana.

Marty noted that, at their last meeting, the Board of Forestry recommended deferring discussion of buffers on dynamic glacial stream reaches pending the results of the above studies. Nancy asked if the group could consider interim standards until such time as these standards are formally updated. Marty responded that any interim standards would have to meet the three objectives noted earlier, and doubted that they could.

After a break, Marty summarized the "non-buffer" issues addressed by the STC.

Regarding Consensus Point (C) 18, the group agreed to break the discussion into two paragraphs. Jack noted that public versus private land (noted in C18) is not a science-related issue, and the group agreed.

The group discussed slope stability standards, and their applicability to public lands in Region III. The group agreed with Marty that the relevant parts of the slope stability standards were covered elsewhere in the regulations. Therefore, there is no need to include them as standards for public lands in Region III.

Marty finished going over the "non-buffer" consensus points from the STC, then the group broke for lunch.

Stream classification

After lunch, Marty discussed some background for the group. Members agreed to the following points:

- **IG-C1:** Stream Classes B1 and B2 should include lakes;
- The break between "dynamic" and "stable" waterbodies should be clarified based on the full definition, rather than the shorthand in the key. [Note: The definition could change following the subcommittee recommendations.]
- **IG-C2:** One water body can have more than one classification. For example, a stream can change from dynamic to non-dynamic over different reaches, and a stream may have different classifications on either bank in a single reach;

- The Division of Forestry (DOF), ADF&G, and landowners do not have much experience distinguishing proposed B and C classes (non-dynamic and dynamic) in the field. Also, the question of seasonal flow and use by fish will have to be addressed.

The question of seasonal flow precipitated a lengthy discussion of what features in a large system such as the Tanana would and would not be likely to be buffered, and how to classify streams as dynamic or stable. Several group members discussed the fish habitat values of seasonally inundated sloughs, how such sloughs change over time, and the whether or not stream bank protection and LWD are important at these sites.

Chris M. drew some examples on the board, and he and Jim D. discussed how they would most likely approach classification in the field.

Jim D. noted that since buffers are measured from the ordinary high water mark (OHWM), sloughs above OHWM would not receive buffers. OHWM is defined in the regulations as "the mark along the bank or shore up to which the presence and action of the tidal or nontidal water are *so common and usual, and so long continued in all ordinary years*, as to leave a natural line impressed on the bank or shore and indicated by erosion, shelving, changes in soil characteristics, destruction of terrestrial vegetation, or other distinctive characteristics." (italics added)

One of the most important factors identified for determining the OHWM was the nature of the vegetation in channels that have seasonal flows and fish use. The group agreed that, in general, channel portions that have terrestrial vegetation in them would be above ordinary high water, while those with aquatically-influenced vegetation would be within OHWM. One caveat noted was that channels with terrestrial vegetation could potentially change to channels with frequent or continuous flow.

IG-C3: The group agreed that site-specific determinations have to be made for seasonally dry sloughs, on the basis of use by anadromous or HVR fish, and on the location of ordinary high water mark.

To help quantify the discussion of how much area was likely to be buffered, Jim F. provided the following figures:

660 feet (1/8 mile) of 66-foot buffer = 1 acre
1 mile of 66-foot buffer = 8 acres

After a break, the group addressed the buffers recommended by the STC for each stream classification, and provided consensus recommendations for private lands.

The group first had a discussion on several general topics including:

1. Variations: Variations from the Forest Resources and Practices Act and regulations (AS 41.17.087) apply across regions and standards, but no specific blanket or small-stream variation

currently exists for Region III. Marty reviewed the standards currently in the FRPA and regulations.

2. Small-scale timber harvest in riparian areas: Doug brought up the example of harvest of house logs in and around small communities. It was generally agreed that as long as the area of harvest is small, such activities would not usually be of concern. Jack asked about a basal area-based general variation.

Jim D. noted that AS 41.17.098 includes the following language: "On private land, the commissioner shall give due deference to the Department of Fish and Game regarding effects on fish habitat from timber operations including … designation of alternative site-specific riparian protection plans … ." He suggested that this language gives some flexibility in how such issues might be addressed.

Doug asked if the size of local operations would likely make them commercial under the FRPA. Marty said that the FRPA Region III regulations define a commercial operation as having an annual harvest of greater than 10,000 board feet, and that the standards would apply to operations of greater than 40 acres for landowners who own more than 160 acres in total. *[Note: FRPA also applies to operations <40 acres if the operation is in or adjacent to a riparian area.]*

The idea of a general variation for wood use by villages was discussed. The group agreed that the issue hinged on defining a threshold amount or acreage of harvest.

TO DO: The group agreed that a subcommittee composed of Doug, Gary, Bill, Jim D. and Chris M. would meet, with the intention of making a recommendation on variation options for private lands.

Buffer recommendations

The group then started looking at the buffers that the STC recommended be applied to specific stream classifications.

Type A, Backwater Sloughs:

The STC recommended a 66-foot minimum buffer for this channel classification. The group discussed the issue of proposing a fixed buffer width, versus a minimum figure as proposed by the STC.

Doug noted that, for this classification, there is not much ground in question.

Gary noted that larger buffers, which could be left under the STC's recommendation, would be a taking from private landowners, and would be hard to explain to shareholders.

Marty noted that in the Region I process completed last year, the consensus between stakeholders played an important role in the successful conclusion of the process, and was particularly important to the legislature.

Fred and Doug agreed, and stated that a simple approach, such as having one number for buffer width is preferable. The group agreed on this approach.

The group then looked at the STC buffer recommendations for the four water body classifications on which consensus was reached:

A: 66' minimum
B1: 66' minimum
B2: 50'-60' minimum
C1: 50'-60' minimum

Jim F. proposed a 66' fixed width buffer for the above water body types.

Gary, Chris M., and Doug noted that Doyon and TCC are currently voluntarily using 66'buffers.

IG-C4: The group agreed that 66' was an acceptable width for buffers on class A, B1, B2, and C1 water bodies containing anadromous and/or high value resident fish on private land.

October 4

The group began the discussion of public lands. Chris M. and Jim D. noted that cooperation between agencies has improved over the last two years, due to improved communication via e-mail, and a better overall working relationship. Chris M. and Jim D. agreed that ADF&G has devoted more time to the issues, and recognized that DNR had made some poor decisions in the past.

The difference between "state" and "other public" lands was discussed. "Other public" in Region III is likely to be Borough and University lands. By regulation, Mental Health Trust lands are considered private lands under the FRPA. Private and "other public" landowners prepare Detailed Plans of Operation (DPOs).

Fred asked about federal lands. Marty said that federal agencies must meet or exceed the standards of the FRPA, but that the main tool for enforcing compliance is the federal Coastal Zone Management Act. She noted that for the Tanana and many other areas in the Interior, the Alaska Coastal Management Program standards do not apply because these areas are not in the coastal zone. However, operations on federal land typically exceed the FRPA standards.

Bill expressed concern that DOF had not given due deference to other agencies in the past, and asked what would prevent a return to earlier, less-cooperative relationships.

Chris M. replied that there is better knowledge and understanding of the issues and of other agencies' responsibilities. He also noted that there is better awareness and oversight by the public and the CAC.

Chris and Bill agreed that there are still some concerns, but that we need to work off the consensus that has been built.

Bill asked if ADF&G Commercial Fisheries and Sport Fish Divisions provide input to Habitat and Restoration (H&R) Division on important areas and issues.

Jim Durst said that they did, and gave the example of the fish radio tagging study by Louis Barton (Commercial Fisheries Division, retired), published in 1992. H&R division based its concerns raised about the Delta area in 1994 on that study and other input from the other ADF&G divisions. He said that H&R also confers with the Sport Fish, Wildlife Conservation, and Subsistence Divisions on a regular basis. He noted that it is not always possible to consult with all other divisions, and that he often has to prioritize based on the situation.

Bill noted that the Fish and Game advisory committees have input from Wildlife and Commercial Fisheries divisions, but not from H&R.

Dale agreed that input from H&R would help, since the advisory committees and boards are doing broader things than in the past (e.g., planning). He said that there is a good working relationship between H&R and Wildlife Divisions in Region III, but that there simply isn't enough time to coordinate. He feels there is room for improvement, and is committed to greater involvement by Wildlife Division.

Bill said that it has been helpful to him to hear about and understand the differences between the missions of the divisions of ADF&G. He noted that educating and informing the public is important, since one ADF&G person is like another to them, until they have that understanding.

Chris F. noted that in Region I, the process for harvesting within a riparian area on public land is fairly formal. He asked if public lands are treated differently from private lands in Region III, and if state lands are treated differently from "other public" lands. He also wanted to know if the 100' riparian zone on public lands is entered in Region III.

Chris M. said that the process in Region III is more informal, but that the process is improving with more H&R input, and better FLUPs and maps. In the past, ADF&G often did not have comments on specific timber sales. He also noted that approximately 17 percent of the harvest on public lands to date has been in floodplain areas, and that the level of protection provided follows the pattern of yesterday's discussion (the drawing on the board).

Nancy asked if there is harvest in the 100-foot riparian zone on public lands, and if the largest and best timber is located there. She asked if the 17% noted above is skewed toward harvest in riparian areas.

Chris M. said that the best timber is not necessarily in the riparian areas, but noted that an issue could arise where all the commercial timber is located along the banks, such as along rivers further north in Alaska.

Jim D. said that the riparian area as defined by the FRPA and the riparian area defined biologically or geomorphologically is not the same. He noted that, regarding how public lands are treated in Region III, there has often been a disconnect in the past: The five-year timber sale plans were very broad, and the FLUPs often did not provide enough site-specific information. He said that in the past, ADF&G has focused on five-year plans, and not on FLUPs for individual sales, which may have generated a perception that ADF&G is not concerned about individual sales.

Chris S. said that the CAC is still getting boiler-plate FLUPs and, therefore, does not feel that the recommendations are science-based.

Chris F. said that on state lands in Region I there is a 100-foot "no-harvest, no way" zone, with an additional zone from 100 to 300 feet, which is considered sensitive to harvest. He said that if the agencies feel that the process is working, then don't fix it, but wondered how the public might perceive it, if state can harvest within the buffer but private landowners cannot.

Nancy said the people understand the rights of private landowners. They also hold the state to a higher standard, since the costs and benefits accrue to the public. Fish and timber are both public resources on public lands.

Jack noted that there are tradeoffs on public lands as well as private lands, and that the standard of protection needs to be driven by science.

Chris S. asked if there is science to support the 100-300 foot zone on state lands in Region I?

Jim F. said yes, including concerns for bears and flood plain protection.

Tom noted that people hunt in riparian areas on public lands.

Jack said that he'd like to see forestry done in a way that benefits wildlife habitat.

Marty said that wildlife habitat must be addressed throughout the timber sale area in the FLUP.

Nancy noted that the river will move over time, so LWD will be an issue in the long-term.

Jim D. said that the STC discussed this issue, but did not have the numbers to quantify it.

Chris M. said that you need to consider the land ownership, and noted that over time you need to consider the growth of young stands into size classes that could provide LWD.

Dale said that the big picture is often poorly addressed, compared to specific sites, but that it is important to do so. We are struggling with how to look at the bigger scale.

Jim D. said that based on the STC recommendations and current standards in the FRPA, he saw two options for state lands:

- 100' no-cut buffer, or
- 66' minimum no-cut buffer, but a riparian area of 100' (implies buffer could be as large as 100')

Fred added another option:

- 100' no-cut buffer, but allow exemptions down to 66'

Jack commented that the process for this approach is cumbersome.

The fourth option is what is currently in the FRPA:

- 100' riparian zone, with variable buffer widths to 100'

The options were numbered as follows (text abbreviated from above):

1. Existing FRPA 100' riparian area;
2. 66' minimum buffer, with 100' riparian area (burden on ADF&G & DEC to expand);
3. 100' buffer, with exemptions allowed to minimum 66' (burden on DOF to reduce);
4. 100'no-cut buffer.

Chris S. said that the value of riparian areas to fish and other resources is large compared to the timber values. He noted that on public lands, the resources belong to the people.

Jack said that "people" includes loggers. Bob agreed, and said that having cheaper wood products is important to the discussion.

Chris M. said that he would like to go through each stream class individually. The group agreed.

After a break, the group took up the stream classifications and standards to be applied to public lands:

I. Type III-A (Backwater Sloughs):

Chris M. and Jim D. were in favor of Option 3. They noted that there are not many Type A reaches.

Fred said that he favors Option 3 versus 2 because ADF&G has limited staff to cover sales over the entire region, while DOF staff prepare sales individually for several areas within the region.

Jack expressed concern that Option 3 trades off timber values, and sets a precedent.

Nancy said that it was important to remember that the STC buffer figures are minimum widths. Chris S. agreed.

Chris M. said that the STC felt that the minimum figures achieved the goals.

Chris S. disagreed, saying that it was the minimum, and expressed concerns about the lack of science to support the STC recommendations. He noted that, as scientific knowledge has increased in the Pacific Northwest and southeast Alaska, buffer widths have increased.

Jim D. expressed concern that the STC numbers were arrived at by a give-and-take process, and that compromise had, to some extent, already occurred. The minimum figures recognize some risk.

Jack said that the implementation group can only look at the STC numbers, and that the STC process was not relevant. He recognized that science is dynamic and that the jury is not in on all points. He asked why Option 2 would not work.

Jim D. said that, recalling the STC process, his experience with variation requests in Region I and FLUPs in Region III, he feels that Option 3 minimizes the risk to public resources.

IG-C5: The group agreed on Option 3 for waterbody type A on state land.

II. Type B1 (Stable, Non-Glacial)

Chris F. favors Option 3.

Bob asked how buffers are treated in the timber base and allowable cut.

Marty and Chris F. said that they are handled in the retention factor and table, and that historically, the actual number has been within the amount or percentage estimated.

IG-C6: The group agreed on Option 3 for waterbody type B1 on state land.

III. Type B2 (Stable, Glacial)

Before discussing this stream type specifically, the group had a lengthy discussion of the definition of dynamic versus stable streams.

There were several questions from the group about what distinguishes a stable versus dynamic stream reach, including concerns about consistency in calls, and how the decision would be made (i.e., looking at cut banks?).

Jim D. said that on the Tanana, we agree probably 80 percent of the time. Jim F. agreed, based on a recent field trip. Jim D. said we should probably have a definition of "cut bank" in this context.

Nancy asked if the group might come to consensus on stream type C2 (Dynamic/Glacial) as well, despite the lack of consensus in the STC.

Marty said that the agencies will take a recommendation to the Board, if the Implementation Group wishes. Jim F. concurred. Marty said that it would be difficult to justify going back to the legislature with a second change to the same standard.

Jack said that he will not support a recommendation for buffers on stream type C2 for private lands without further information.

Chris S. asked Jack if he could support a recommendation for public lands.

Jack said that he will discuss it, but will not make any promises.

Chris S. said that dynamic stream reaches are "donating" trees to streams, and that they are providing energy to stream systems through LWD.

Tom noted that fish carcasses also affect terrestrial vegetation.

Jim D. passed a photo of a stream bank around, and asked the group if it represented a dynamic or stable section of the Tanana. The group unanimously agreed that it was dynamic.

Fred noted that the time frame is important to such a determination, since reaches change over time.

TO DO: The group agreed to appoint a sub-group to review and, if necessary, revise the definition of dynamic and stable stream reaches, and identify some photo examples. The sub-group will report back to the full group at the next meeting. The members of the sub-group are: Jim Durst, Chris Stark, Doug Hanson, and Marc Lee

Nancy noted that the quantity of wood in the system is as important as other functions of wood, and a lot of the wood is coming from dynamic reaches.

The group then returned to the discussion of channel Type B2.

Chris S. asked if glacial versus non-glacial were differentiated in southeast Alaska. Jim F. noted that the FRPA does not distinguish between them, and that the Tongass Land Management Plan riparian management standards treat glacial outwash systems the same as floodplain systems, which have the highest degree of protection.

Chris S. said that glacial and non-glacial stable reaches should be treated the same, as they have similar processes and concerns.

Jim D. noted that in the lower Tanana (around Fairbanks), the hydrograph is still similar to a glacially influenced stream, despite inputs from clear-water, non-glacial systems. He said that stable glacial reaches are similar to but also different from stable non-glacial reaches, with respect to energy, bedload, cross-section, LWD residence time, and so on. He said that stable glacial reaches can have a valuable, high biomass of fish in the summer, and particularly HVR fish.

Chris S. said again that he would favor the same treatment for Type B2 as B1.

Chris M. pointed out some examples of B2 types on an aerial photo/map, and the group agreed with the examples.

Nancy asked where the clear-water upwellings and spawning gravels fall in the overall classification.

Chris M. said that they are distributed throughout. He said that wood is a more important issue in upwelling areas than siltation, as these areas are constantly flushing themselves.

Jim D. noted that the matrix of estimated impacts is best professional judgment, and could change over time. Several members agreed.

Chris M. proposed Management Option 2 for discussion. He said that it shares the burden between the agencies to use this option on stream type B2.

Chris S. and Nancy disagreed on the basis that the STC recommendations were not much lower for type B2 than type B1.

Jack said that Option 2 is not necessarily less protection, and that it just changes the burden of proof.

Chris S. noted that there is a burden on ADF&G, which has one person to cover at least three DNR area offices. He also noted that B2 reaches are not different from B1 reaches for at least part of the year.

The final lineup is as follows:

In favor of Option 2: Jim D., Gary, Doug, Bob, Jack, Chris M.
In favor of Option 3: Chris F., Fred, Bill, Chris S., Nancy

IV. Type C1 (Dynamic/Non-glacial)

The group agreed that there are not many examples in this category.

IG-C7: The group reached consensus that Option 3 would be applied to waterbody type C1 on state land.

The next issue was the extent of anadromous and HVR fish habitat.

Marty covered what is currently in the FRPA and regulations, including FRPA definition of anadromous water body (AS 41.17.950(1)) and regulations definition of "physical blockage" (11 AAC 95.900(58)), and the anadromous fish blockage table in the Regulations.

Jim D. noted that in Region 3, there is some physical blockage of anadromous fish passage, and some systems where for unknown reasons there are no anadromous fish. He said that in Region 3 it is not appropriate to focus only on anadromous fish, since HVR fish are very important. He also noted that, from a practical standpoint, there are not many places where the two types of fish are mutually exclusive.

The other question that Jim D. brought up is the lack of knowledge of where a HVR fish may spawn and rear (versus where it may be caught). One part of the answer is that blockage is not a big issue, in general, and the group agreed.

Jim D. said that another concern is looking for fish in streams that are only accessible in the winter. Also, a stream may not be important fish habitat in winter, but could be at other times.

Doug, referring to the fact that some systems don't have fish, asked if there are any criteria that can be used, such as size, to determine if a stream is high-value or not.

Chris S. said that small side streams can be important, as they may have a lot of productivity (insects and other food), and provide good refugia from predation.

Chris F. said that on private lands, operators identify streams on the DPO, and the agencies decide if they want a field review. On public lands, streams are assumed to be anadromous, if they are connected to cataloged reaches with no intervening blockage. In southeast, presence or absence of anadromous fish in streams is the primary determinant, but there is no similar standard for HVR. He also noted that southeast generally has a "cleaner" time frame or window for field reviews. Also, in southeast, village and regional corporations usually had advance knowledge of where they would be operating next, so areas could often be field reviewed in advance.

Marty summarized what is currently in regulation, including a 30-day review period, and the requirement that a field review be conducted within 21 days of when a site is available and accessible. She also noted that the regulations require inspections when fish are likely to be present. The group recognized that these provisions could be in conflict, particularly in Region III.

Jim D. noted that resident fish are very mobile in systems, and travel great distances.

Chris M. asked if there are HVR systems without anadromous fish.

Jim D. said that the Gerstle and Little Gerstle probably only have seasonal use by high value resident fish.

Marty asked the group if we might be able to do a "presumed blockage table" for fish in Region III. Chris M. said another way to phrase it would be "presumed habitat."

After lunch, the group continued the discussion of HVR habitat.

Marty suggested that we might be able to address the issue by compiling three lists of stream systems:

1. Non-fish streams
2. Anadromous streams (covers most HVR)
3. HVR only

Jim D. said that the problem with this approach is that we may end up "writing off" small streams, which can be important to rearing.

Chris M. said that the timber industry will be shut down under a general "protect all HVR streams" approach.

Chris S. asked if it would be possible to provide more advance notice to the state.

Doug said no, that harvest is market driven. Often, decisions are made in the fall to harvest in the winter. In further discussion, it was noted that there is more time for review on state timber sales, due to the planning process.

The group agreed that two issues exist. One is the timing of field reviews, the other is adequate identification of fish habitat.

Nancy asked if, regarding a threshold for changing the level of stream protection, a bank-full width limit makes sense.

There was some discussion of the small stream variations process in Region I.

It was agreed that the characteristics we are looking for regarding streams that might qualify for a small stream variation are: small, anadromous and/or HVR, and in a commercial forest area.

Two questions were asked:

1. Is there a gradient break that we can pick that applies to HVR fish?

Chris S, Jim D., Chris M. and Doug agreed to form a sub-group to look into this issue.

A second question for this group is:

2. Is there a size cutoff that we can pick that applies to HVR fish?

Chris S. put it as: What would the industry be willing to live with on smaller HVR streams?

Doug said that he doesn't think that there are many small streams with HVR fish.

After a break, Mike Doxey, ADF&G Sport Fish Division joined the group by phone.

Some of what Mike said included:

- Small streams are the roots of productivity;
- Small streams can be very important seasonally;
- The STC was not thinking of sub-group classifications (within drainages);
- Fish are very mobile in most systems, and colonize and re-colonize areas rapidly;
- Some species move further than others;
- Some species move over considerable distances, and through intervening reaches of relatively poor habitat;

The group asked Mike his opinion of a stream size standard. Mike said it was difficult, and that where the water is not turbid, anoxic, or iron-rich, and is greater than 2' wide, there is likely to be fish. Due to his expertise in this area, the group felt that Mike should be on the sub-group, and Mike agreed.

In summary, the charge for the group is:

TO DO: Jim D., Chris S., Chris M, Doug, and Mike Doxey will form a subcommittee to consider the issue of riparian standards for small HVR fish streams that are not anadromous. They will make recommendations to the Implementation Group on whether there is a gradient, width, size cutoff or other threshold below which a lesser standard than the 66' buffer should be applied. If so, what standard should be applied?

There followed a side discussion with Chris S, Doug, and Bill saying that there may not be many HVR streams that would fall into the smaller category, as they have not run into many.

The group then moved on to the issue of "other public" land. There was a brief discussion of where such lands, which were identified as University and Borough, occur.

IG-C8: The group agreed that other public lands should be subject to the same standards as state lands.

IG-C9: The group agreed that, per the STC recommendations, water bars should be added to the regulations at .290(g), as a water quality protection measure for winter roads.

The next topic was the proposed STC language on ice crossings.

IG-C10 The group agreed sections 3) and 4) from the STC consensus point on this topic be added to the regulations as follows:

(e) For all water body classes in Region III, crossings may be allowed on natural ice. Natural ice thickness may be augmented if site-specific conditions (e.g., water depth) are sufficient to protect fish habitat. The determination of whether conditions are sufficient should consider whether increased ice thickness is likely to:

(1) cause freezedown into gravels used for spawning or overwintering,
(2) cause bed scouring that disturbs gravels used for spawning or overwintering,
(3) excessively reduce the quality or volume of overwintering habitat, or
(4) adversely alter stream flow patterns above or below the crossing.

Augmentation includes adding ice to the surface or removing snow to increase freezing depths.

Jack asked who makes the call on whether an ice crossing is appropriate at a site.

Marty said that it is DNR, with due deference to ADF&G, since it is a road location within a riparian area.

Jim D. said it might be possible to cover this issue in ADF&G Title 16 permits, and that there is some overlap now.

Jack said that he preferred the "one-stop shopping" approach that the FRPA was intended to provide.

TO DO: Jim D. and Jim F. agreed to discuss the issue of the use of FRPA versus Title 16 standards with ADF&G H&R management, and report back.

The group then discussed the issue of ice ramps and crossings, and the use of vegetation in them. The chief concern was the use of the term "debris" in 11 AAC 95.300, which could include any kind of wood.

IG-C11: The group agreed to replace the word "debris" with "mat," in 11 AAC 95.300. This better describes the intent of the language. "Organic mat" is defined in 11 AAC 95.900(54).

IG-C12: The group agreed to remove the applicability of slope stability standards to public lands in Region III. The STC had said that they were based primarily on mass wasting concerns in Region I, and that they were covered under other sections of the regulations.

Jim D. noted that the STC had not said that there was any scientific reason to remove the standards, only that they were redundant.

The group agreed to defer adding a definition of "backwater slough" until we see if this channel type is broken out from the others in the final package.

IG-C13: The group agreed to add a definition for "lake or pond" for Region III that does not include language about an identifiable inlet and outlet.

Doug suggested that we probably don't need the language "and a population of anadromous or HVR fish." Marty suggested that we wait until we see the final classification system, and the group agreed.

The group then discussed the current problem with the definition of the terms temporary and permanent road. Currently, a temporary road is in place less than three years, and permanent road is in place for more than 20 years.

The group agreed that it is the culvert and bridges on the roads that are probably the biggest issue.

Fred asked if permanent really means that a road is designed to a higher standard, but will be closed eventually.

Chris M. said that permanent is supposed to mean permanent.

Jim D. said that 20 years is too long for a temporary road, especially given that these roads have crossings designed for a 25-year flood event. He noted that the main silvicultural reason to have them in place is to complete the restocking certification at seven years. Jack wondered about this issue in light of possible extended timber sales, i.e., ten years.

The group had a discussion on the appropriateness of 3, 5, 7, or 10 years as the determinant of road status, looking at regeneration surveys, cost of construction and maintenance, and the length of the sale.

IG-C14: The group reached consensus that temporary roads or crossings are those that will be left in place for less than five years or less; permanent roads or crossings will be left in place more than five years.

Marty then quickly summarized the consensus points:

1. Three sub-groups will address unresolved issues:

    1) General variations/selective harvest in buffers
    2) Definition of dynamic and stable stream reaches
    3) HVR fish habitat: cutoff point for lesser standards, and what would those standards be?

2. Classification system: Types B1 and B2 should include lakes. The classification system may be compressed, depending on the outcome of the recommendations for buffers.

3. On seasonally dry sloughs, the ordinary high water standard will apply with respect to determining the need for buffers.

4. Private lands should receive 66' buffers on all channel types that the group discussed (Types A, B1, B2, and C1).

5. On state lands, consensus was reached that on channel types A, B1, and C1, 100' buffers would be applied, but that they might be reduced to 66' where consistent with the protection of water quality, fish habitat, and wildlife habitat.

6. On state lands, channel type B2 should either receive the protection described in 5., or should receive 66' buffers that may be widened to 100'.

7. Other public lands should have the same standards as state lands.

8. Water bars will be added to water quality protection measures on winter roads.

9. Ice crossings will be approved by DNR with due deference to ADF&G and DEC, and the language in parts 3) and 4) of the STC consensus point on ice crossings will be added to the regulations.

10. In the regulations for bridge standards (300(a)(5)), "debris" will be changed to "mat."

11. Slope stability standards will not apply in Region III.

12. A new definition of "lake or pond" will be added for Region III.

13. In Region III, the cutoff point for temporary versus permanent roads will be five years.

The agenda for the next meeting will include reports from the three subcommittees, the final recommendations for buffers on all land ownerships and classifications, and drafting statutory/regulatory language.

The next meeting date was uncertain at the end of the first meeting, but is now scheduled for November 6 and 7 in Fairbanks.

<u>Handouts</u>

- Agenda
- Power, G., R. Cunjak, J. Flannagan, and C. Katopodis. 1993. Biological effects of river ice. pp. 97-127 In Prowse, T. D., and N. C. Gridley, editors. Environmental aspects of river ice. Environment Canada, National Hydrology Research Institute Science Report No. 5.
- Draft annotated bibliography
- Revised draft waterbody classification key (6/26/00)
- Revised draft list of examples by waterbody type (6/26/00)

- Revised buffer recommendation chart (6/26/00)
- Revised non-buffer recommendation chart (6/26/00)

Jim/ForestPractices/Region 3 STC/Implementation Group/RIII FP IG Mtg1 Minutes Draft1.doc

Region III Forest Practices Implementation Group
MEETING #2 MINUTES – November 6-7, 2000
DNR Large Conference Room, Fairbanks, AK

Attendance
Fred Dean, Boreal Forest Council
Jim Durst, ADF&G
Jill Klein, Yukon River Drainage Fisheries Association
Jim Ferguson, Co-Chair, ADF&G
Chris Foley, ADEC
Marty Welbourn Freeman, Co-Chair, ADNR
Nancy Fresco, Northern Alaska Environmental Center
Doug Hanson, Tanana Chiefs Conference
Gary Lee, Doyon, Ltd. (2nd day, briefly by phone)
Chris Maisch, ADNR
Jack Phelps, Alaska Forest Association
Chris Stark, Bering Sea Fisherman's Association
Bob Zachel, Alaska Birch Works

Note: Handouts referenced in the minutes are available from either co-chair.

November 6

Introductions and schedule

The meeting started at 8:50 a.m., with Jack, Chris S. and Gary not present. Jill Klein, who was sitting in for Bill Fliris, introduced herself to the group.

Marty briefly explained the process that will be followed. The Implementation Group (IG) should produce a water body classification system, and a package of proposed changes to the Forest Resources and Practices Act (FRPA) and regulations. The Board of Forestry will consider the package at their November meeting in Fairbanks. If they approve it, then it will be forwarded to the Governor to determine how to introduce it in the legislature.

The group then considered the draft minutes from the first IG meeting. Jim D. proposed some changes, which the group accepted. The group also agreed to add the drawing from the board that was used for discussion in the first meeting.

Subcommittee Reports

Next, the subcommittees appointed at the first IG meeting reported on their progress. Jim D. led the discussions, as he was involved with all three groups. Handouts of the subcommittee products were distributed. The discussion of the recommendations from each subcommittee were mingled to some extent, so the following section includes various topics considered by the subcommittees in the order in which they were discussed by the IG.

The first recommendation was to add a column in the existing "presumed fish blockage" table in the regulations [11 AAC 95.265] to cover Arctic Grayling. The figures were obtained from the FishXing and Fishpass models, and from field observations. The subcommittee noted that the table is not particularly useful in Region III, as there are few places that reach these criteria. The figures are:

Maximum Fall Height	7 ft
Pool Depth	no recommendation
Steep Channel	≥300' @at 5% percent gradient
	≥200' @at 7% percent gradient
	≥150' @at 10% percent gradient

The subcommittee also suggested that the breaks in the existing table for pink and chum salmon are probably too low given conditions in Region III.

Second, the subcommittees recommended a water body classification system that did not distinguish between dynamic and stable reaches. The main reason is that, while the state agencies would probably agree on 70-80 percent of the calls on dynamic versus stable reaches, agreement would be difficult on the remaining 20-30 percent, even in the field. One charge to the group was to design a classification system that could be implemented in the field. The subcommittees felt that the existing proposal could not be easily implemented. Further, the subcommittees were concerned that no recommendation had been made for dynamic glacial reaches. The following recommendation was made:

- Backwater Sloughs: No change from IG meeting 1;

- Non-glacial streams and lakes: No change from IG meeting 1;

- Glacial streams: The subcommittees proposed the following modification from IG meeting 1:

  Provide buffers on all glacial streams that would have a no-cut zone near the stream, and a variable retention zone between the no-cut zone and the timber harvest unit. The concept was derived from the small streamside zone variation in Region I. The variable retention zone would allow harvest of timber without the necessity of requesting a variation. The standards proposed for the variable retention zones are:

  Up to 50 percent of the stems could be harvested; and

  Only white spruce $\underline{\geq}$9" dbh would be eligible for harvest.

- The proposal is to have a 50-footwide no cut zone and 50-footwide variable retention zone on public lands, and a 33-footwide equivalentzones on private lands.

Doug said that 9" dbh is a good figure, as it represents the lower limit of what is typically merchantable.

Regarding the issue of small high-value resident (HVR) fish streams <3' in width, the subcommittee said that these would typically be streams in upland areas. The group looked at some examples in the Tanana basin on an enlarged enhanced aerial photo on the wall.

Jim D. said that one issue is that roads to harvest units will cross these streams, and noted that there would probably be few of them in harvest units. However, some kind of ground verification is needed in order to make an exact recommendation.

Chris M. noted that the Science and Technical Committee (STC) did not discuss this issue, and did not list any such streams as examples. He suggested that a small STC group needs to be convened to address the widths of streamside zones on these small HVR streams.

The group discussed the implementation of "status quo" (100' riparian area with harvest allowed if DNR determines that no significant impact to fish habitat or water quality will occur), and agreed that it would work in the interim.

Jim D. suggested that the issue can be resolved in the field. He also noted that the group tried to use gradient as a cutoff, but could not make any one figure work.

Bob said that the intermittent nature of small streams should be considered. For example, if you field checked a stream in a wet year, a larger buffer would make more sense.

Chris M. and Jim D. said that it is important to articulate what the issues are: for example, is the concern LWD, temperature, organic material input, etc.

Bob said that there probably wouldn't be much cutting in areas where you would find such streams. On state lands, the agencies would have lead time to identify such streams, since a sale is required to be on two consecutive 5-year Schedules of Timber Sales.

Chris M. noted that the 3' width is somewhat arbitrary.

Nancy asked if a formal process to address small streams will be proposed, and if the group should make a formal recommendation for status quo and for forming a group to address the issue.

Marty suggested that there should be a separate, Region III-specific process to address this issue, and that it should not be combined with the upcoming work in Region II.

Doug said that he thought there would be few forestry activities that intersect with these areas.

IG-C15 The group agreed that ADNR and ADF&G will look at the issue of small (<3 feet wide at OHWM) high value resident fish streams in the field in 2001, and will address three questions:

- Are there HVR-only (e.g., no anadromous fish) streams? How far up the stream do fish occur? What is the extent of this stream type?
- How much overlap is there between small streams and commercial timber lands?

- What is the proper width for a cutoff for small streams? What level of protection is appropriate for small streams?

In the fall, a Science & Technical Committee will consider the findings of the agencies.

Jim F. asked the subcommittee to confirm that at least 50 percent of the white spruce will be retained in variable retention areas on glacial streams, and asked how the percentage would be determined.

Chris M. said that the figure was at least 50 percent retention, and that it would be based on the number of trees, not on basal area, which would be more difficult to measure.

Jack Phelps joined the group at this point.

IG-C16 The group agreed that the best definition for small streams now is non-glacial, < 3' width, and HVR fish only.

The group then had a lengthy discussion of how the variable retention areas would work, and how they would be defined and laid out on public and private lands.

Chris M. suggested that the following standards apply to harvest in variable retention zones:

- No equipment may be operated in the no-cut zone;
- Directional felling, including into the no-cut zone, is allowed to minimize damage to residual trees (he illustrated this point with a drawing on the board);
- Tops left in no-cut zone should be treated to control Ips beetles and other insects.
- Leave snags, trees with multiple stems, and other trees that have high potential wildlife value.

He said that on public land, with a 50-foot no cut zone and a 50-foot variable retention zone, DNR would probably mark a line at 50 and 100 feet from ordinary high water mark. He said that the number of trees per acre in the riparian area would be based on the cruise for the entire timber sale area. He felt that this approach would provide a conservative estimate in the riparian area, since the riparian area is likely to have a higher density of trees than other areas.

The group then discussed how the variable retention zone was likely to look on the ground. Doug and Chris provided information on a study done by Tanana Chiefs Conference on the number of stems within buffers, including charts of the location and diameter of the trees in some study plots. Doug said that the riparian areas in the study had between 60 and 120 tress per acre.

Nancy said that it is possible that when 50 percent of the white spruce are removed, that they could all be considerably greater than 9 inches dbh; Chris M. agreed.

IG-C17 The group agreed that the removal of trees from the variable retention zone should be well-distributed along the buffer and not, for example, in one clump.

Chris M. noted that white spruce responds well to thinning, so the residual smaller trees should grow into larger classes at an increased rate, which will help with recruitment of LWD.

Chris F. asked if the landowner would have the option of using a whole area plot cruise or a strip cruise in the buffer to estimate the number of white spruce per acre.

Doug said that TCC would like to be able to use either.

Jack asked why 50 percent of the actual number of trees could not be used.

Chris F. said that, at least for public lands, the impression that we are taking a conservative approach by using a whole area plot cruise could be a selling point with the public.

Marty said that we should tell the public that the state is unlikely to invest in a strip cruise in the buffer.

Jack said that he feels that is a good approach for public lands, that it minimizes costs and maximizes retention. He is concerned that we might lock private landowners into one approach, and wants to leave options open.

Fred said that the question is what is needed in the stream. If we need larger stems, then we need a reasonable diameter limit, or a relatively high percent retention.

Jim D. asked how the area cruise would work. Chris M. said that the timber sale area is delineated, and then a one plot per acre is laid out on a grid.

Nancy said that the method seems O.K., but that the STC recommended 50-60 feet minimum protection on glacial non-dynamic streams. The proposal is for a 33-foot no-cut zone on private lands: does this approach meet the intent of the STC? Other group members noted that there was no consensus on buffers on dynamic glacial streams.

Jim F. asked if a variation to harvest timber within the 33-foot no-cut zone would be allowed?

Jim D. said that the intent would be to avoid a variation, but that technically it is allowed.

Jack said that he reads the proposal as a substitute for variations on private land buffers.

Chris M. said that another approach would be to have a 66-foot no-cut buffer, but allow variations. This point was discussed by the group. The group preferred the variable retention zone approach.

Nancy said that since the retention is 50 percent, that maybe a 50' no-cut buffer would be about the same as a 33-foot no cut buffer with a 33-foot retention zone, and asked if industry and landowners might prefer that approach as being simpler.

Chris S. said that this approach should be considered, as it is simpler.

Fred asked if there might be advantages to a variable retention zone versus a "hard edged" 50-foot buffer.

Jack said that variable retention would result in some "feathering" of the buffer.

Chris M. said that winds are usually oriented up and down river, but that some storms can blow perpendicular to the stream. He also said that some windthrow is probably all right, since the primary objective is providing LWD to the stream.

Fred asked if trees exposed at the edge of a buffer are prone to sun scald. Chris M. replied that it depends on the exposure of the site. The group had some discussion at this point on what would actually be retained in the variable retention zone, and looked again at the TCC study of buffers.

Chris S. said that there is no science to say whether the buffer should be 50-foot no-cut or 33-foot no-cut and 33 foot variable retention.

Jack asked about variations. Marty said that they would be allowed, subject to the requirements in the law (AS 38.05.087) and subject to due deference to ADF&G. They would probably be rare within the 33-foot no-cut zone.

Doug said that he thought either approach would work, and asked that he be allowed to talk to Gary before weighing in for either approach.

Jim D. said that there is latitude built into the recommendation to allow variable-width buffers. He noted the example of the Gerstle River, which is technically a HVR fish waterbody throughout, since fish migrate up it. However, the truly important HVR fish habitat in the river is probably at either end of the system.

The group then discussed the question of agency "burden" regarding the decision to harvest within buffers on backwater sloughs and non-glacial anadromous and HVR fish water bodies on state lands.

IG-C18 The group agreed that the decision to harvest in the 66'-100' area of buffers on Type III-A waters should be made by DNR with the concurrence of ADF&G, which would put the burden on both agencies.

At this point, Marty put all the proposals on the board, including a 50-foot no cut or 33-foot no cut with 33-foot variable retention zone along glacial streams on private lands.

The group had a brief discussion of recommendations that might be made on research needs for Region III.

IG-C19 The committee recommended the following research projects.

- Analysis of existing data, including the TCC buffer study, and the study on Elaine Long's property;
- Completing the catalog of anadromous waters, and making it available electronically; and
- Establishing a common hydrography data layer for users of GIS.

Marty briefly reviewed the consensus points so far, and noted that there would be a summary of the Region III process, similar to the "green book" for Region I.

Doug pointed out that the group had not yet discussed the distinction between personal use and commercial timber harvest in Region III.

Jim D. said that the current division of greater or less than 10,000 bf may be unrealistic, given that house log harvest in the Interior probably frequently exceeds that amount. He said it was not unusual for a housing project to be undertaken that involves the construction of three or four houses, each of which might use around 10,000 bf. He also said that this kind of harvest is dispersed and episodic.

IG-C20 The proposal from the subcommittee was to change the definition of commercial timber harvest to greater than 30,000 bf in Region III. The group agreed to make this change.

Nancy asked if there was any way to educate local wood users about dispersing small-scale timber harvest to protect riparian areas.

Chris M. said that such harvest is probably dispersed by its very nature, but that is would be good for DNR to produce a pamphlet on what is commercial versus small-scale timber harvest.

The group agreed to break for the day. Marty and Jim F. agreed to write a draft of the proposed changes to the FRPA and regulations for the group to consider the next day.

November 7

All members were present except Gary.

The group first brought up the issue of the possible utilization of hardwoods in variable retention zones, but there was no resolution, and the group did not propose any change to the variable retention guidelines.

Marty also noted that the definition of anadromous stream still includes a discussion of physical blockage, so it will need some work.

There was a lengthy discussion of how "glacial" and "non-glacial" water bodies will be distinguished, given that there could be streams that are overwhelmingly influenced by one source, but could have a small input from other

sources. A suggestion was made to include the terms "significant" and "under normal conditions" to the definitions, and have a list of examples.

Marty noted that the agencies are proposing that stream classifications in the FRPA regulations be included in the FRPA itself, and that classifications be amended to be region-specific, e.g. I-A, III-A, etc.

Marty went over the other proposed changes to the riparian standards, and noted that other changes would be made in the regulations as well (these were discussed in the first IG meeting).

The group took a break, while Doug, Bob, and Jack contacted Gary to discuss the 50' buffer versus 33'/33' buffer proposed yesterday. They reported back that Gary prefers the 33'/33' approach, since the 50' "absolute" zone is wider than the 33' "absolute" zone. He had asked about the logistics of variations within the 33' no-cut zone. Marty responded that it was extremely unlikely that such a variation would be granted, given the automatic allowance for harvest in the outer 33' of the 66' buffer.

IG-C21 The group agreed to adopt the variable retention zone buffers for glacial water bodies. (see attached sheet)

IG-C22 The group agreed to the package of recommendations summarized in the attached chart.

They also agreed that the University of Alaska and the Fairbanks North Star Borough should be consulted about the standards for "other public lands" being the same as those for state lands. Marty will check with UA and the Borough.

Handouts

- Agenda
- Subcommittee reports

Attachment

Summary of recommendations from Implementation Group

IGminutes#2-DRAFT.doc

Region III Forest Practices Implementation Group
Minutes of October 31 and November 2, 2000 Working Group meetings

At the Oct. 3-4 meeting of the Implementation Group, three subcommittees were created to focus on specific issues and report back to the full Group at the Nov. 6-7 meeting. The following is the synopsis of what was concluded at the subcommittee meetings, documented by Jim Durst, ADF&G and presented to the Implementation Group on November 6, 2000.

The first session was held the afternoon of October 31, 2000 with the following attendees:

- Steve Clautice, DNR-DOF
- Jim Durst, ADF&G-H&RD
- Doug Hanson, Tanana Chiefs
- Chris Maisch, DNR-DOF
- Chris Stark, Bering Sea Fisherman's Assn.

The second session was all day November 2, 2000 with the following attendees:

- Fred Dean, Alaska Boreal Forest Council
- Mike Doxey, ADF&G-Sport Fish
- Jim Durst, ADF&G-H&RD
- Doug Hanson, Tanana Chiefs Conference
- Chris Maisch, DNR-DOF
- Chris Stark, Bering Sea Fisherman's Assn.
- Bill Fliris, YRDFA (participated briefly by telephone in the morning).

The subcommittees first worked to develop definitions of stable compared to dynamic stream reaches for glacial and nonglacial waters, and to provide examples. The subcommittee made progress toward a common set of definitions, but it was evident that significantly more work and refinement would be needed to clarify the 20%-30% or so of streams that would fall into the gray areas of each definition.

The door was opened to a more encompassing examination of riparian issues over two days, including commercial harvest thresholds, personal use of timber, riparian standard recommendations, and separation of one type of stream for later evaluation when Chris M. reminded the subcommittee that finalizing the definitions was necessary only if the riparian prescriptions for stable and dynamic reaches were different. The subcommittee meetings resulted in the following recommendations being brought back to the Implementation Group for consideration:

Personal use of timber
The resource agencies should review the issue of personal use of timber (primarily from riparian areas) for such uses as home construction in rural areas, and develop regulatory language to address this topic as needed.

Commercial harvest threshold
The Implementation Group and resource agencies should review the threshold for commercial harvest, and consider developing regulatory language to raise it from 10 thousand board feet (mbf) to 30 mbf for Region III.

Small upland nonglacial streams
Small (3 ft or less wide at OHW), upland, nonglacial streams with HVR fish but not anadromous fish should be separated from the current process and considered separately. The extent of such water bodies, their occurrence in or near commercial timber, and what the appropriate riparian standard might be needs to be assessed. This will require at least half a year, and should not be allowed to hinder progress on other waterbody types which are more likely to have timber harvest occur along them in the interim.

Other nonglacial waterbodies, and backwater sloughs
Continue to recommend what was developed at the Oct. 3-4 meeting: 100' no-cut buffer with exceptions down to 66' on public land; 66' no-cut buffer on private land. No differentiation need be made between stable and dynamic nonglacial waterbodies at the implementation level.

Glacial waterbodies
Recommend that dynamic and stable glacial water bodies be combined, and the recommendations from the Oct 3-4 meeting be revised to: 100' buffer on public land, 66' buffer on private land; streamside half of buffer no-cut; unit half of buffer variable retention; variable retention factor to allow harvest of up to 50% of the qualifying stems, defined as white spruce with a 9" or greater dbh. Felling and yarding equipment may not enter streamside half of buffer. Where feasible and prudent, minimize yarding equipment in unit half of buffer, fell within the unit half of the buffer or into the unit. Tops could be left within the buffer (either half) provided they are treated to control insects.

Site-specific flexibility
Since each of the waterbody types encompasses a wide variety of site types, the resource agencies should have the flexibility to approve alternative site-specific riparian protection plans on both public and private land.

The subcommittees specifically noted that these recommendations are not intended to change the stream classification system developed by the S/TC, but are instead intended to facilitate consistent field implementation and provide for easier monitoring.

Board of Forestry Minutes – Excerpts that address the Region III review

EXCERPTS OF BOARD OF FORESTRY MINUTES ADDRESSING REGION III RECOMMENDATIONS

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The portions of Board of Forestry meeting minutes addressing the Region III riparian standards review process are attached.

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OCTOBER 27, 1998, FAIRBANKS

Region II and III riparian standards. Marty Welbourn summarized the results of the August and September workshops on research priorities in FRPA regions II and III. The resource agencies are pursuing funding for a number of the research priorities. In addition to research recommendations, the agencies agree that there is an opportunity to progress with review of Region III riparian standards. In the first half of 1999, the agencies will work with scientists and forest managers to develop a water body classification system for Region III. The second phase of the work will be to map the water bodies by class in areas with active forest management. Following mapping, they will meet again to determine what standards can be reviewed and if necessary revised based on existing information, and which will need additional research. Phases II and III depend on additional funding.

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FEBRUARY 3, 1999, JUNEAU

Region III riparian standards. Marty Welbourn (Division of Forestry, DOF) briefed the Board on the status of the Region III riparian standards review process. The agencies will meet by teleconference on February 5, 1999 to discuss committee organization and membership for the stream classification committee. Members will include representatives of the resource agencies, and scientists from the University of Alaska, federal agencies, and the private sector. The committee will meet this spring with the goal of completing a classification system by the end of FY 99. This phase of the project will be accomplished with existing agency funds. Phase two of the project will map the stream classes, and phase three will review the Region III issues that don't require additional research and recommend appropriate revisions. The project will address fish habitat and water quality issues under the authority of the Forest Resources and Practices Act (FRPA). Other state land issues such as recreation and scenic quality will be addressed through land planning processes. An update of the Tanana Valley State Forest Management Plan is currently underway. Rick Smeriglio asked about expectations for a similar process in Region II. Welbourn replied that the Region III process is estimated to take about 1-1/2 years, and a Region II review would follow.

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JULY 28-29, 1999, ANCHORAGE

Progress Report on Region III waterbody classification process and riparian standard review. Marty Welbourn presented an update on the Region III process (see also materials in Board packet). She emphasized that this is a progress report. The committee is not yet ready to make final recommendations. In particular, management of upwelling areas is still under discussion. All recommendations are draft at this point and will be subject to committee review

when they reconvene in the fall. She also clarified that the committee's charge is to consider fish habitat and water quality protection under the FRPA. It is not charged with addressing multiple use issues, such as wildlife habitat, recreation, and scenic quality. On state land, multiple use issues are addressed through land management plans.

Process to date. The Committee has met five times, beginning in March, 1999. It is taking a break for the summer and fall for field work, data analysis, and compilation of additional information. The committee will reconvene again in late fall/early winter to incorporate information from the 1999 field season -- including 319-funded studies on Tanana River dynamics and Tanana fish habitat – and to review and update the draft recommendations. A final package should be available to the Board in the fiRst half of 2000.

Key topics.

- Stream classification. The Committee completed a draft stream classification system for Region III fish streams that has seven subclasses. Following completion of the riparian management recommendations, the committee will review the classification system and may condense some subclasses. (Key and list of examples in Board packet)

- Matrix of water body types and FRPA habitat components. The Committee reviewed each stream class with respect to the ten fish habitat components in AS 41.17.115. For each class, the committee assessed how important the component is to the productivity of fish habitat, and how likely forestry operations are to affect the component. (Colored chart handed out at meeting).

- Buffer recommendations. The committee unanimously agrees that buffers are needed on glacial backwater sloughs and all non-glacial water bodies that support anadromous or high value resident fish. Minimum buffers of 66' are recommended for these types based on tree heights for LWD and shading distances at Region III latitudes. Buffers should be expanded where necessary to prevent sedimentation from steep slopes adjacent to riparian areas. Buffers along backwater sloughs should also be expanded where necessary to maintain natural shading.

  Based on current information, buffers are not required to protect fish habitat or water quality on the main stem and side channels of glacial water bodies because
- bank erosion is not controlled by vegetation in this water body class,
- buffers would have little impact on stream temperature in these glacial systems,
- harvesting at current or projected levels won't significantly affect the input of large woody debris to these systems, and
- these systems do not provide spawning beds except in limited areas, such as groundwater upwellings.

  The committee recognized that specific management standards are needed for upwellings in glacial waters. Discussions of upwellings are in progress, and will be considered further at upcoming meetings.

- Slope stability standards. Because of redundancy with other regulations (11 AAC 95.280(d)(1), (3),(4),(5)) and the buffers recommended for Region III, and because of the lack of known slope stability hazards in Region III, there is not a scientific reason to keep the slope stability standards for Region III. Retention of low value-timber is the main difference between the slope stability standards and other existing BMPs, and isn't needed to protect slope stability in Region III.

- Lake definition. The definition for lake or pond should be broadened to include waterbodies with high value resident fish populations. A number of important lakes for sport fishing with high value resident fish populations have no outlet, and don't fall under the existing definition of "lake or pond" in the regulations.

- Upwellings. Clearwater upwellings are important for spawning and overwintering of juvenile fish within the large glacial river systems. In the Tanana River and some other streams, warm water from groundwater sources is particularly important for fall spawning chum and coho. The committee has begun discussing management of these key riparian areas, including standards for winter crossings near upwellings, but more information is needed before recommendations are finalized.

- Road definitions. The Committee noted that there is a gap in the FRPA regulation defintions for roads – temporary roads exist for less than 3 years; permanent roads for more than 20 years (11 AAC 95.840 (57) and (83). This issue is outside the charge of the Region III riparian committee, but should be addressed when regulation amendments are proposed.

Larry Hartig noted that one of the main issues regarding buffers in the Interior is providing visual screening from forest operations. People may want buffers even if they are not needed for fish habitat or water quality. The economics of retaining timber in buffers versus benefits from other uses such as recreation are different in the Interior than in Region I. He also noted that Region III is huge, and includes far more than just the Tanana Basin.

OCTOBER 27-28, 1999, FAIRBANKS

Update on Region III Waterbody Classification Process and Riparian Standard Review: Jim Durst, ADF&G, provided an update on Region III waterbody classification as well as giving a slide presentation. See tab 6, Importance Matrix of Waterbody Types and FRPA Habitat Components. He mentioned there were five meetings of the committee. A lack of personal services time has hindered the literature review. No changes for new regulations will be available soon as much of the work is yet to be completed – perhaps January 2001.

Debra Clausen voiced the importance of the literature search including the need of buffer strips on glacial streams. Rick Smeriligio asked if you can rely on out-of-region literature (e.g., Columbia or Stikine Rivers) as applicable in Region III since our rivers here are 6 months clear and 6 months glacial. Jim Durst remarked they are still looking for the Rosetta Stone with regard to applicability of data from other locations. The committee will put in writing all assumptions that lead to the chart's creation.

FEBRUARY 2-3, 2000, JUNEAU

Update on Region III waterbody classification process and riparian standard review. Freeman reported that the Region III committee met twice since the last Board meeting. Jim Ferguson is now the ADF&G co-chair, and Jim Durst is an ADF&G representative on the committee. UAF fishery biologist Nick Hughes has joined the committee. The committee is currently working on literature review as recommended by the Board at its last meeting. Interim reports indicate that there is virtually no information on the topic of large woody debris in interior waters. Work on clearwater streams in other areas is probably relevant to clearwater streams in Region III, but it's unclear whether there are applicable studies on glacial waters. On ice bridges, there is abundant information on how to build ice bridges, but nothing on the impacts of ice crossings on fish habitat. Five other topics are under review: buffer strip design, bank stability, permafrost and silty soils, upwellings, and winter fish use of glacial streams. Freeman commended commend committee members for the considerable time they have contributed to committee work and for their cooperative spirit. The committee will have an update on the literature reviews on February 25, and complete the reviews by March 21. We intend to present the package of recommendations at the Board's July meeting, review the proposals with interest groups to test their feasibility, then return to the Board for approval at the fall meeting.

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AUGUST 2-3, 2000, ANCHORAGE

Region III waterbody classification and riparian standards. Marty Welbourn Freeman summarized the work of the Region III Science/Technical Committee (S/TC). The S/TC has completed the three tasks given it by the Board:

- Reviewing and documenting relevant research and identifying information gaps
- Developing a draft waterbody classification system
- Reviewing current riparian management standards and recommending changes.

Bibliography. The Board received copies of the draft annotated bibliography for Region III research relevant to forest management. Only minor editing remains prior to printing a final version and putting it on DNR's web site. Copies will be distributed to the Board, the Tanana Valley State Forest Citizens' Advisory Committee, the S/TC, and the agencies. The bibliography covers

- Buffer function and design,
- Stream bank stability,
- Large woody debris,
- Permafrost and silty soils,
- Winter fish use of glacial streams,
- Fish use of upwellings, and
- Ice crossings.

The bibliography was a major undertaking. Thanks for the work go to the authors -- John Fox, and Jim Reynolds of the University of Alaska, Fairbanks, Bob Ott from Tanana Chiefs Conference, Torre Jorgenson of Alaska Biological Research, Jim Durst and Jim Ferguson of ADF&G, and Deanne Pinney from the DNR Division of Geological and Geophysical Surveys.

Waterbody classification system. The goal was to develop as simple a system as possible that could be used reliably in the field, and that reflected differences in needed management actions. The S/TC developed a matrix evaluating each type with respect to the importance of each of the 10 habitat

components in AS 41.17.115, and to the susceptibility of each component to effects from forestry activities. The committee used the matrix to help develop the classification system and focus discussions on the key issues for riparian management.

The S/TC recommended the following classification system (see handouts with key and examples).
Waters with anadromous or high value resident fish
Type A – Backwater sloughs
Type B – Stable reaches
    Subtype B1 – Non-glacial waters
    Subtype B2 – Glacial waters
Type C – Dynamic reaches
    Subtype C1 – Non-glacial waters
    Subtype C2 – Glacial waters

No anadromous or HVR fish
Other surface waters

Buffer recommendations (see handout). The committee quickly reached consensus that non-glacial streams, sloughs in both glacial and clearwater rivers, and lakes that have anadromous or high value resident fish need buffers. The dynamics of these waters and the associated fish habitat are similar enough to waters in Interior Alaska to apply the research in Region III. Research in many areas has affirmed the need for buffers to protect fish habitat in such waters. After additional discussion, the committee agreed that stable reaches or channels in glacial waters also need buffers, primarily to supply large woody debris (LWD).

- Size of standard buffer
  Type A/Backwater sloughs – the main reasons for buffers in these waters are to provide LWD for fish habitat, and shading to prevent summer warming and retain dissolved oxygen. The S/TC recommends a buffer of 66' buffer based on
- sun angles for shade (62-67' in summer) in areas of typical tree height (70'), and
- area needed for LWD – 2/3 average dominant tree height = 50-60' and height to 4" top ~50'.
  The buffer should be widened in areas where the typical tree height is greater than 70' maintain shading (e.g., 72-77' if average tree height is 80')

  Type B/Stable reaches or channels, and lakes
  Subtype B1 – Non-glacial waters – buffers are needed for LWD, shade, bank stability, channel morphology, and prevention of sedimentation. Recommended buffer width (50-60') is based on LWD recruitment and sun angles (see Type A). The width needed to provide these functions should also provide the other functions. The buffer should be widened if necessary to prevent sedimentation from adjacent steep slopes, but there is no data on how much the buffer should be widened in these cases. Steep slopes relatively rare in harvest areas.
  Subtype B2 – Glacial waters – buffers are needed to provide LWD (min. of 50-60').

  Type C/Dynamic reaches –
  Subtype C1 – Non-glacial waters – buffers are needed for LWD (min. of 50-60').
  Subtype C2 – Glacial waters – There was no consensus on whether buffers are needed to protect fish habitat in this type.
  Other surface waters – use standard BMPs in regulations to protect water quality.

These recommendations would make the following changes relative to the existing system:
- A buffer would be required on all types except possibly C2

- Buffer size <100' based on width needed for LWD and shade; the same width should provide the other functions as well
- High value resident fish waters would be included in all buffer recommendations

Freeman suggested that the Board had at least three options for with respect to Type C2:
1) The Board could recommend a buffer and identify the functions to be provided by a buffer or recommend a specific width.
2) The Board could recommend that a buffer not be required except where site-specific conditions merit
3) The Board could direct the agencies to proceed with other recommendations; leave C2 under current system until more information is available or as leave it as is but with a 50-60' buffer width based on LWD recruitment.

Other recommendations (see handout). Slope stability standards -- Because of redundancy with other regulations and the buffers recommended for Region III (see handout), and because of the lack of known slope stability hazards in Region III, there is not a scientific reason to keep the slope stability standards for Region III. Retention of low value-timber (11 AAC 95.180(d)(2)) isn't needed to protect slope stability on tributaries to anadromous and high value resident fish streams in Region III (not steep slopes/high rainfall/big trees as in SE). If a decision is made to retain slope stability standards for Region III, they should apply consistently to anadromous and high value resident fish streams. High value resident fish populations are important for subsistence in the interior.

Winter roading. Use of water bars should be added to the list of practices used to prevent rutting, ground disturbance, or thermal erosion in 11 AAC 290(g)(1). If water starts to flow on the surface of a winter road, water bars can be effective at preventing erosion.

Ice crossings. For all water body classes, crossings may be allowed on natural ice. Natural ice thickness may be augmented if site-specific conditions (e.g., water depth) are sufficient to protect fish habitat.

Definitions. Definitions of "backwater slough" should be added to the regulations. The definition for "lake or pond" in Region III should be broadened to include waterbodies with high value resident fish populations. The Board should consider changing the definitions for "temporary roads and crossing structures" and "permanent roads and crossing structures" to clarify the status of roads and structures that are built to last between 3 and 20 years.

Freeman noted that there are still many data gaps, especially on interactions of forestry and fish habitat along dynamic rivers such as the Tanana. The Tanana River Dynamics and Tanana Fish Habitat projects currently in progress will help provide some key information.

A few additional issues may need to be addressed, depending on the outcome of recommendations from implementation group members on statutory and regulatory changes. These include
- The definition of uncatalogued anadromous waters in Region III – end of anadromy often isn't a "physical blockage". The presumed blockage chart doesn't fit Region III.
- If riparian standards apply to high value resident fish waters on private land in Region III, we may need to clarify how these are identified (similar to the process for anadromous waters).
- Applicability of site-specific variations in Region III.

Following the presentation, John Sturgeon recommended that the agencies proceed with convening an implementation group to recommend specific statutory and regulatory changes for all but the buffer issue on type C2. He recommended deferring the decision until riparian standards for Region II are reviewed. By that time more information will be available from the Tanana River Dynamics and Tanana Fish Habitat studies. A vote on the recommendation was deferred pending a quorum.

John Sturgeon and Jeff Jahnke praised the S/TC for their work. Sturgeon said that this is a good process that gives faith in government. Jahnke asked that Freeman draft letters of thanks from the Board to the committee members and their supervisors.

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NOVEMBER 15-16, 2000, FAIRBANKS

Region III Implementation Group. Marty Welbourn Freeman, DOF, briefed the Board on the recommendations from the Region III Implementation Group on riparian standards *(see handouts)*. The Group made consensus recommendations that would

- classify all anadromous and high value resident fish waters into three types: Type III-A (glacial backwater sloughs, non-glacial waters other than small streams with only high value resident fish), Type III-B (other glacial waters), and Type III-C (small non-glacial streams with only high value resident fish);
- establish riparian areas on each type, with buffers on Types III-A and III-B, and a special management zone on Type III-C. Type III-B buffers allow harvest of up to 50% of the large white spruce in the landward half of the buffer.
- establish guidelines for harvesting within variable retention zones in Type III-B riparian areas;
- recommended that DNR and ADF&G jointly examine the extent, distribution, and characteristics of Type III-C streams in the field in 2001 to determine how much Type III-C riparian areas overlap with commercial forests, and what is needed to provide adequate protection for fish habitat in these streams.
- raise the threshhold for FRPA applicability in Region III to allow for traditional, scattered harvesting along Interior rivers;
- Delete slope stability standards for Region III because of minimal hazards of mass wasting and duplication with buffer requirements and BMPs;
- Add water bars to the list of practices that may be used to prevent erosion on winter roads;
- Change "organic debris" to "organic mat" in the regulation on snow ramps and ice bridges to be consistent with definitions
- Require review of likely impacts of ice bridges on fish habitat when natural ice thickness will be augmented;
- redefine "lake or pond" to include Region III lakes with valuable fisheries that do not have an inlet or outlet;
- redefine "temporary" and "permanent" roads and crossing structures to eliminate the gap between the definitions;

Ferguson commended M. Freeman for all her work, stating that the Implementation Group did a great job on a solution that was acceptable to everyone. He said that the I.G. recommendation on glacial rivers is a good one, and supports condensing the classifications as recommended by the group. ADF&G is comfortable with the status quo recommendation for small high value resident fish streams (Type III-C). Allowing harvest in the variable retention zone of Type III-B buffers will allow remaining trees to grow into the size classes to provide LWD.

Maisch noted that the emphasis in the variable retention provisions in the Type III-B buffer is on allowing landowner to remove some of the high value trees, while retaining a supply of large woody debris. Smaller spruce have little value for the landowners. Will have foresters doing the work, including high and low marking of trees to ensure that the right trees are cut. Harvest trees within this zone will be identified and marked prior to harvest. Durst concurred that the 9" limit reflects input from the landowners and operators on what constitutes high value trees.

Maisch reviewed examples of stem maps from two sites along the Tanana that showed tree diameter within the buffer zone, to give a sense of what the buffers would look like with partial harvest in the landward half. He said that removing trees in the landward half will feather that edge of the buffer. He also noted that the Implementation Group agreed that harvest trees should be well distributed – they can't all be in one clump. Freeman and Ferguson concurred, and that change will be included in the proposed regulations.

Lindh said that he would submit a few suggestions for minor clarifications after the meeting.

Wolfe raised a concern that the Type III-A buffer on public land allows harvesting in the landward 33 feet with the "concurrence" of ADF&G. He said that the use of "concurrence" rather than due deference changes the relationship between DNR and ADF&G that exists in the rest of the Act. Freeman noted that the Implementation Group did discuss that point, and concluded that in the buffer on this waterbody type, it is appropriate that the decision be shared. This is the Interior waterbody types with the most potential for impact from forestry operations.

Wolfe asked about the extent of impact of the change in the definition of "lake and pond". Freeman responded that the definition only applies to Region III, and only to waters with anadromous or high value resident fish populations. At present this is a limited number, and commonly occurs where ADF&G has stocked lakes. DOF doesn't anticipate a lot of overlap these lakes and commercial timber harvest areas.

Wolfe said he would find out about industry's position on the change in the road definition. Freeman confirmed that the change in the definition is only proposed for Region III at this time. In response to another question from Wolfe she added that the guidelines for the variable retention area in Type III-B buffers also apply only to Region III.

Hartig inquired whether restricting waterbody classification to stream type and not soil type was okay. Freeman said that the Science and Technical Committee did consider permafrost, and concluded that the big risks associated with permafrost, such as thawing in unstable areas, are associated with roads, and that guidelines already exist for these activities. The main concern is where ground cover is removed, which mainly occurs from road-building rather than harvesting.

Smeriglio asked how lakes and pond would be classified. Freeman explained that they could be either Type III-A or Type III-B if they have anadromous or high-value resident fish populations, or "surface waters" if they don't have such fish populations.

Durst, using a map for reference, said it would be up to ADF&G to determine what would be adequate protection for fish habitat in Type III-C riparian areas, and that this determination

would give more control than a set buffer. He said that there was a mechanism in place to resolve differences between DNR and ADF&G and that he was not concerned about Type III-C streams from a fish habitat point of view and thought they could be fairly easily protected.

Smeriglio asked if there were fish in those streams, even small fish, could Durst conceive of a timber operation that would remove everything up to the banks that would leave adequate protection. Durst replied that he could not off the top of his head. Smeriglio expressed concern that a no-cut buffer is not required on Type III-C streams. He recognized that these streams may need a smaller buffer than bigger streams. He added that he would be comfortable if he were confident that ADF&G always gets due deference, but thought there could be a problem. Durst responded that these small streams tend to be in areas where the gradient increases and streams become more contained. The riparian management recommendations on the Type III-C streams allows more flexibility than a fixed buffer.

In response to a question from Clausen, Freeman explained that the standard for Type III-C waters on private land is the same as the current standard. On public land it provides more flexibility than the current standard. She added that the Implementation Group wanted to determine protection for these waters site by site until better information is available on this stream type.

Jeffress said that allowing some harvest in riparian areas could even enhance fish production at some sites, for example by increasing stream temperature where low temperatures limit productivity. He said each stream is a site-specific case and it should be up to DNR and ADF&G to work out the specifics. Durst agreed that temperature and light drive a lot of the productivity. Overhanging trees also provide nutrients. He recognized that this agreement commits ADF&G to a lot of field time. It will take time to figure out how the new system works. He asked the Board to be cautious about tinkering with the proposed package, because it was laboriously wrestled with by the I.G., and there really is consensus. Ferguson concurred that it is a well-crafted compromise. Eleazer noted that the variable retention area is similar to the small streamside zones in Region I.
Smeriglio asked whether the public or private land standard is more restrictive for Type III-C streams. Ferguson responded that it is tighter on public land because it recognizes fish and wildlife habitat.

Hartig wanted to know how stream width is measured. Freeman explained that width is measured from ordinary high water (OHWM) as it is throughout the state. Measurements will be difficult in some spots, but field staff are used working with the definition of OHWM.

Hartig asked if the time for measuring OHWM is in the regulation, since some streams can migrate over time. Freeman said the time is not specified, but that it is at the time the unit is laid out in the field.

Hartig wanted to know if, as a resident, there was some standard to judge ADF&G's decision of "adequate protection" for fish habitat. Ferguson noted that "adequate protection" is the test in Region III under the existing Act and regulations, but there is no further definition of a standard.

Freeman added that the FRPA (AS 41.17.115) lists the ten habitat components to be protected, and sets the "adequate protection" standard.

Wolfe asked whether the agencies have received adequate input from the university and municipality. Freeman said that the have been contacted, but that DNR hasn't yet received their responses. DOF will make sure the trusts and Fairbanks Borough, the major landowners in the "other public land" category, are comfortable with the proposals before we move forward with legislation.

Jahnke said that the agencies would like to begin the legislative process. The Implementation Group drafted legislative language. Based on the Board's discussion, and subject to the following points, we would like to complete review with the Department of Law and the Governor's Office and bring proposed legislation to the board in January.

1. We will add a requirement that harvest trees within the variable retention area in Type III-B buffers must be well-distributed. We will review the package with the University, Mental Health Trust, and Fairbanks North Star Borough. We will notify the Board of their response.
2. We will await a response from Wolfe on the issue of using "concurrence" as the standard for agreement on harvesting within Type III-A buffers on public land.
3. We will await a response from Smeriglio on the question of whether a no-cut buffer is needed on Type III-C streams.

Jahnke summarized by saying that there has been a tremendous amount of work with a lot of sharing concerns and listening to concerns to get this package to this point. He expressed appreciation for everyone's effort. Freeman added that the key to progress was work by the subcommittees between full Implementation Group meetings. She also noted that a lot of the information considered during this process didn't even exist a few years ago, and that a side benefit of the project was that it provided a stimulus for new research and consolidation of existing information.

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FEBRUARY 14-15, 2001, JUNEAU
SECOND DRAFT

Note: *The draft minutes from the February 2001 meeting were sent to the Board for initial review, and comments were incorporated into the second draft. The minutes will not be final until approved at the August 2001 Board meeting.*

Region III legislation. Marty Freeman, DOF reviewed the draft legislation implementing the Region III changes. The legislation

- incorporates the recommendations of the Implementation Group as endorsed by the Board at the November 2000 meeting;
- changes the nomenclature for the Region I waterbody classes from "Type A, B, C, and D" to "Type I-A, I-B, I-C, and I-D" to avoid confusion between Region I and Region III waterbody classes;

- moves the definitions of "ordinary high water mark" from the regulations to the Act; and
- moves the region boundaries from the regulations to the Act. The descriptions of the boundaries are simplified to make them easier to follow. The draft bill also moves the boundary between Region I and II on the Kenai Peninsula to better follow the break between coastal and boreal forest types.

The Board asked to put of the bill on the agenda for the following morning to allow time to consider the change to the regional boundaries. *(see pp. 14-15)*

Region III, cont. The Board reopened the discussion of proposed Region III legislation. Wolfe proposed the following change to p. 7, line 25 of the draft bill protect Sealaska's interest in issues outside Region III.

> "REGULATIONS. (a) To the extent that the regulations are not inconsistent with the language and purposes of this Act, regulations relating to forest resources and practices adopted by the Department of Natural Resources under AS 41.17 and in effect and otherwise valid before the effective date of secs. 1-10 of this Act remain in effect as valid regulations implementing this Act, and may be administered and enforced by the Department of Natural Resources."

Sealaska has an appeal currently under consideration. One of the issues is whether a regulation is consistent with the FRPA. Wolfe doesn't want this bill to affect the validity of existing regulations.

Jahnke said that if the Board agrees with the concept of not having this bill validate existing regulations, we will work with our drafters and the Sealaska attorney to develop language to do that.

The Board unanimously resolved that:

> It is the Board's understanding that the proposed statute is not intended to address or change the validity or invalidity of current regulations. The Board asks that the drafters clarify this in the language in Section 11, subpara (a).

Smeriglio asked about the proposed Region III regulatory changes. Jahnke answered that DOF will proceed with the regulations after passage of the Act, and they should be adopted within a year of passage.

Smeriglio asked why the standard for work with ADF&G is "concurrence" for Type III-A riparian areas and due deference for Type III-C, but not specified for Type III-B. Freeman answered that due deference is the standard under the Act within defined riparian areas and would apply to Type III-B areas.

The Board unanimously passed the following resolution:

"The Board recommends that the bill as drafted with the resolution above be passed to the Governor for introduction."

Hartig said that the Board had worked through a consensus process to develop the bill. It is carefully crafted and has broad consensus among agencies and interest groups. The Board agreed. DOF will include such a statement in a cover letter from the Board and in the annual report from the Board to the Governor.

Jahnke thanked staff of DNR, DEC, and ADF&G and others who participated in this constructive process.

[Note: following the Board meeting, Jahnke and Freeman met with the Attorney General's Office. The AGO recommended deleting the phrase referring to "valid regulations". Wolfe agreed that this resolved the issue. The bill was introduced on February 16, 2001 as HB131 and SB99.]

Text of Legislation -- HB 131/SB 88

Governor Knowles introduced legislation to implement the recommendations from the Region III review on February 16, 2001. The bill was introduced as HB 131/SB 98. Text for the legislation follows.

HOUSE BILL NO. 131 February 26, 2001
"An Act relating to standards for forest resources and practices; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

Section 1. AS 41.17.087(b) is amended to read:

(b) The commissioner shall adopt regulations that specify the standards under which a variation will be granted for harvesting timber within the riparian area of

(1) a low gradient **Type I-A** [TYPE A] water body with a width of five feet or less; and

(2) other appropriate water body types.

Sec. 2. AS 41.17.116 is repealed and reenacted to read:

Sec. 41.17.116. Riparian standards for private land. (a) Private forest land adjacent to the following types of waters and located in Region I is subject to the riparian protection standards established in this subsection:

(1) along a Type I-A water body,

(A) operations within 100 feet of the water body or to the break of the slope, whichever area is smaller, shall be conducted in compliance with slope stability standards established in regulations adopted under this chapter; and

(B) harvest of timber may not be undertaken within 66 feet of the water body;

(2) along a Type I-B water body,

(A) operations within 100 feet of the water body or to the break of the slope, whichever area is smaller, shall be conducted in compliance with slope stability standards established in regulations adopted under this chapter; and

(B) harvest of timber may not be undertaken within 66 feet of the water body or to the break of the slope, whichever area is smaller;

(3) along a Type I-C water body,

(A) operations within 100 feet of the water body or to the break of the slope, whichever area is smaller, shall be conducted in compliance with slope stability standards established in regulations adopted under this chapter; and

(B) the operator shall, where prudent, retain low value timber within 25 feet of the water body or to the limit of the area described in (A) of this paragraph, whichever area is greater, where the width of the water body is

(i) greater than 13 feet at the ordinary high water mark; or

(ii) greater than eight feet at the ordinary high water mark if the channel is incised;

(4) along a Type I-D water body,

(A) operations within 50 feet of the water body or to the break of the slope, whichever area is smaller, shall be conducted in compliance with slope stability standards established in regulations adopted under this chapter; and

(B) the operator shall, where prudent, retain low value timber within 25 feet of the water body or to the limit of the area described in (A) of this paragraph, whichever area is greater, where the width of the water body is

(i) greater than 13 feet at the ordinary high water mark; or

(ii) greater than eight feet at the ordinary high water mark if the channel is incised.

(b) Private forest land adjacent to the following types of waters and located in Region III is subject to the riparian protection standards established in this subsection:

(1) along a Type III-A water body, harvest of timber may not be undertaken within 66 feet of the water body;

(2) along a Type III-B water body, harvest of timber may not be undertaken within 33 feet of the water body; between 33 feet and 66 feet from the water body, up to 50 percent of standing white spruce trees having at least a nine-inch diameter at breast height may be harvested without requiring a variation;

(3) along a Type III-C water body, harvest of timber within 100 feet of the water body must be located and designed primarily to protect fish habitat and surface water quality as determined by the department with due deference to the Department of Fish and Game.

(c) The commissioner shall adopt regulations for private land in Region II that designate the areas that are subject to riparian protection standards, and the restrictions on timber harvesting operations within those areas that are necessary for their protection under the management goals established in AS 41.17.115.

(d) In this section,

(1) "low value timber" means timber that the owner or operator determines, at the time of harvest, to be uneconomic to harvest and market;

(2) "prudent" means that the requirement can be met using reasonably available means or technology, that complying with the requirement is not likely to create significant impairment of the productivity of the land and water, and that the cost of achieving the requirement is not out of proportion to the benefits that can reasonably be expected to be achieved in the particular situation.

Sec. 3. AS 41.17.118(a) is repealed and reenacted to read:

(a) The riparian standards for state land are as follows:

(1) on state forest land managed by the department that is located in Region III,

(A) along a Type III-A water body, harvest of timber may not be undertaken within 100 feet of the water body, except that between 66 feet and 100 feet from the water body harvest of timber may be undertaken where consistent with the maintenance of important fish and wildlife habitat as determined by the department with the concurrence of the Department of Fish and Game;

(B) along a Type III-B water body, harvest of timber may not be undertaken within 50 feet of the water body; between 50 feet and 100 feet from the water body, up to 50 percent of standing white spruce trees having at least a nine-inch diameter at breast height may be harvested;

(C) along a Type III-C water body, harvest of timber within 100 feet of the water body must be consistent with the maintenance of important fish and wildlife habitat as determined by the department with due deference to the Department of Fish and Game.

(2) on state forest land managed by the department that is in Region I or Region II,

(A) harvest of timber may not be undertaken within 100 feet immediately adjacent to an anadromous or high value resident fish water body;

(B) between 100 and 300 feet from the water body, harvest of timber may occur but must be consistent with the maintenance of important fish and wildlife habitat as determined by the department with due deference to the Department of Fish and Game.

Sec. 4. AS 41.17.119 is repealed and reenacted to read:

Sec. 41.17.119. Minimum riparian standards for other public land. The riparian standards for other public land are as follows:

(1) in Regions I and II, harvest of timber may not be undertaken within 100 feet of an anadromous or high value resident fish water body;

(2) in Region III, the standards are the same as for state land under AS 41.17.118 and regulations adopted under this chapter.

Sec. 5. AS 41.17.950(13) is amended to read:

(13) "riparian area" means

(A) the areas **subject to riparian protection standards** [SPECIFIED] in AS 41.17.116(a) **and (b)**on private land in **Regions I and III** [THE COASTAL FOREST OF SPRUCE OR HEMLOCK];

(B) the areas subject to riparian protection standards [SPECIFIED] in regulations adopted by the commissioner under AS 41.17.116(c)[AS 41.17.116(b)] on private land in Region II [OUTSIDE THE COASTAL FOREST OF SPRUCE OR HEMLOCK];

(C) the area 100 feet from the shore or bank **of** [OR] an anadromous or high value resident fish water body on state land managed by the department and on other public land;

Sec. 6. AS 41.17.950(19) is amended to read:

(19) "**Type I-A** [TYPE A] water body" means **in Region I**, an anadromous water body that is

(A) a stream or river of any size having an average gradient of eight percent or less, with banks held in place by vegetation, channels that are not incised, and a substrate composed of rubble, gravel, sand**,** or silt;

(B) wetlands and lakes, including their outlets; [AND]

(C) an estuarine area delimited by the presence of salt-tolerant vegetation;

Sec. 7. AS 41.17.950(20) is amended to read:

(20) "**Type I-B** [TYPE B] water body" means **in Region I**, an anadromous water body that does not meet the definition of a **Type I-A** [TYPE A] water body; [AND]

Sec. 8. AS 41.17.950(21) is amended to read:

(21) "**Type I-C** [TYPE C] water body" means **in Region I,** a water body that is not anadromous, that is a tributary to a **Type I-A** [TYPE A] or **Type I-B** [TYPE B] water body, and that has a gradient of 12 percent or less;

Sec. 9. AS 41.17.950(22) is amended to read:

(22) "**Type I-D** [TYPE D] water body" means **in Region I,** a water body that is not anadromous, that is tributary to a **Type I-A** [TYPE A] or **Type I-B** [TYPE B] water body, and that has a gradient greater than 12 percent.

Sec. 10. AS 41.17.950 is amended by adding new paragraphs to read:

(23) "backwater slough" means a water body that

(A) has sluggish flow, is warm in summer, and is typically only connected to the main stem or a side channel at one end of the water body;

(B) carries river current only under high water conditions; and

(C) may have only a seasonal connection to the main stem or side channel;

(24) "glacial water body," as used in the phrases "glacial high value resident fish water body" and "glacial anadromous water body," means a water body that, under normal conditions, receives significant surface flow from a glacier; "glacial water body" includes water bodies that receive a mix of glacial water and water from other sources;

(25) "non-glacial water body," as used in the phrases "non-glacial high value resident fish water body" and "non-glacial anadromous water body," means a water body that, under normal conditions, does not receive significant surface flow from a glacier;

(26) "ordinary high water mark" or "OHWM" means the mark along the bank or shore up to which the presence and action of the tidal or nontidal water are so common and usual, and so long continued in all ordinary years, as to leave a natural line impressed on the bank or shore and indicated by erosion, shelving, changes in soil characteristics, destruction of terrestrial vegetation, or other distinctive physical characteristics;

(27) "Region I" means all land in Southeast Alaska, plus all land that is south of the crest of the Chugach and St. Elias Mountains and east of a line running from the crest of the Chugach Mountains to O'Malley Peak, then southerly to Gull Rock, then southwesterly to the eastern junction of Skilak Lake Road and the Sterling Highway, then southwesterly to the mouth of the Fox River, then southwesterly through Kachemak Bay to Mt. Douglas, plus all land on the Alaska Peninsula between Mt. Douglas and Cape Kumliun that is east of the crest of the Aleutian Range, plus all islands in the Gulf of Alaska north of 56° 23" North latitude;

(28) "Region II" means all land in the state south of the Nutzotin and Mentasta Mountains, south of the Alaska Range, and east of the Aleutian Range, except for the area within Region I and peninsular and island land south of Cape Kumliun;

(29) "Region III" means all land in the state outside of Regions I and II;

(30) "Type III-A water body" means in Region III, a

(A) non-glacial high value resident fish water body greater than three feet in width at the ordinary high water mark;

(B) non-glacial anadromous water body; or

(C) backwater slough;

(31) "Type III-B water body" means in Region III, a glacial high value resident fish water body or a glacial anadromous water body; "Type III-B water body" does not include glacial backwater sloughs;

(32) "Type III-C water body" means in Region III, a non-glacial high value resident fish water body that is less than or equal to three feet in width at the ordinary high water mark (OHWM) and that does not contain anadromous fish.

Sec. 11. The uncodified law of the State of Alaska is amended by adding a new section to read:

TRANSITION: REGULATIONS. (a) To the extent that the regulations are not inconsistent with the language and purposes of this Act, regulations relating to forest resources and practices adopted by the Department of Natural Resources under AS 41.17 and in effect before the effective date of secs. 1 - 10 of this Act remain in effect and may be administered and enforced by the Department of Natural Resources.

(b) Notwithstanding sec. 13 of this Act, the Department of Natural Resources may proceed to adopt regulations to implement this Act. The regulations take effect under AS 44.62 (Administrative Procedure Act), but not before the effective date of the statutory change.

Sec. 12. Section 11(b) of this Act takes effect immediately under AS 01.10.070(c).

Sec. 13. Except as provided in sec. 12 of this Act, this Act takes effect September 1, 2001.