February 26-27, 2008

Seven Feathers Casino
Canyonville, Oregon

WESTERN OREGON LAMPREY WORKSHOP

On February 26th and 27th, over 140 lamprey research scientists, managers, agencies, Tribes, watershed councils, non-profits, and other entities came together to talk and learn about lamprey of Western Oregon. Day one of the workshop included presentations on Western Oregon lamprey research, funding opportunities, Tribal cultural values of lamprey, and insights on lamprey conservation and habitat restoration. Day two entailed a half-day field tour to Winchester Dam in Roseburg, Oregon to discuss lamprey passage and restoration projects.

Coordinators of the workshop were Amy Amoroso of Cow Creek Band of Umpqua Tribe of Indians, Mike Gray of Oregon Department of Fish & Wildlife, and Bianca Streif of U.S. Fish and Wildlife Service.

This write-up includes abstracts or summaries of each of the presentations, as well as summaries of the discussions that followed each panel. A summary of the field tour is also included. Speaker biographies and contact information, as well as the workshop registrant list follows.

Table of Contents

Pacific Lamprey
Photo by Robin Petersen Lewis

Additional resources relevant to lamprey research, conservation, and cultural values, as well as avenues for further discussion and sharing are included at the end. Most presentations from the workshop can be viewed at http://www.fws.gov/pacific/fisheries/sp_habcon/lamprey/index.html.

Thank you to everyone who attended the workshop and to the presenters who shared with us their knowledge, experiences, and enthusiasm for lamprey of Western Oregon.

Workshop Agenda

TUESDAY – Feb. 26th

8 – 8:15 am	Welcome, introduction, logistics	Amy Amoroso
8:15 – 8:45 am	Tribal Welcome	

Research in Western Oregon

8:45 – 9:00 am	Western Oregon research	Carl Schreck/Ben Clemens
9:00 – 9:15 am	Western Oregon research	Abel Brumo
9:15 – 9:30 am	Diversity in western lampreys	Stuart Reid
9:30 – 9:45 am	Siletz tribal research and restoration	Stan van De Wetering
9:45 – 10:00 am	Monitoring-protocols and pitfalls	Jason Dunham
10:00 – 10:15 am	Break	
10:15 – 10:35 am	Panel Discussion and Q & A	

Funding Opportunities for Lamprey Conservation

10:35 – 10:50 am	Funding Local Projects	Bob Kinyon
10:50 – 11:05 am	ODFW Funding	Audrey Hatch
11:05 – 11:20 am	USFWS Funding	Vicki Finn
11:20 – 11:35 am	Oregon Sea Grant Funding	Mikell O'Mealy
11:35 – 12:00 am	Panel Discussion and Q & A	

12:00 – 1:00 pm Hosted lunch

Western Oregon Tribal Cultural Values for Lampreys

1:00 – 1:20 pm	Karuk Tribal Perspectives	Ron Reed
1:20 – 1:40 pm	Siletz Tribal Perspectives	Stan van de Wetering
1:40 – 2:00 pm	Coquille Tribal Perspectives	Don Ivy
2:00 - 2:30 pm	Panel Discussion and Q & A	
2:30 – 2:50 pm	Break	

Lamprey Conservation & Restoration

2:50 – 3:10 pm	Monitoring, conservation, restoration	Stephanie Gunckel
3:10 – 3:30 pm	Conservation measures for instream projects	Bianca Streif
3:30 – 3:50 pm	Smith and Umpqua Rivers Research	Sam Moyers
3:50 – 4:10 pm	Ammocoete Identification	Damon Goodman
4:10 – 4:20 pm	STREAMNET data/mapping	Bruce Schmidt
4:20 – 5:00 pm	Panel Discussion and Q & A	

5:00 – 6:00 pm Social

6:00 – 7:00 pm Hosted dinner and Keynote Speaker David Potte

WEDNESDAY – Feb. 27th

Lamprey Restoration Field Tour

8:00 am – 12:00 pm	Visit to Winchester Dam	Sam Moyer

WORKSHOP PRESENTATIONS AND PANEL DISCUSSIONS

Included below are abstracts provided by speakers as well as summaries of those presentations that did not include PowerPoint presentations. All PowerPoint presentations utilized during the workshop can be accessed in a separate document at http://www.fws.gov/pacific/fisheries/sp_habcon/lamprey/index.html.

Research in Western Oregon

Critical unknowns, restoration and current research

Carl B. Schreck, Oregon State University
Benjamin J. Clemens, Oregon State University

ABSTRACT — Status of Pacific lamprey is of concern, and knowledge is needed about taxonomy, life history, status and trends, tolerance limits, limiting factors and recovery actions limiting factors maturation timing in relation to temperature will be essential for management. Restoration and recovery actions must be thought of as experiments and include a monitoring component and an adaptive management plan. We are conducting several studies to examine critical limiting factors to lamprey production and also to delineate diversity in maturation timing. We will focus on two of these studies with respect to adult Pacific lamprey at Willamette Falls, Oregon. The first experiment tested the effects of high summertime temperatures on body size, maturation timing and mortality rates, and the second on monitoring of maturation times and characteristics of Pacific lamprey at Willamette Falls, OR. We subjected lamprey to high summertime temperatures that mimicked thermal regimes in the Willamette River (20-24 ºC; i.e., treatment) and compared the survival, maturation timing and body size of these animals with lamprey held at cooler temperatures representing the mean annual temperatures in the Willamette River (12-14 ºC; i.e., control). Treatment fish: 1) exhibited statistically significant decreases in body weight in comparison with control fish, 2) exhibited 100% maturation vs. 53% maturation for control fish, and 3) had a 92% overall death rate vs. 61% for control fish. All mortalities were mature fish during the springtime following treatment. For the second study, we monitored maturation timing and characteristics of lamprey at Willamette Falls, OR. Maturation occurred before river temperatures exceeded 20 ºC. Fish collected after this period had gonadosomatic indexes more similar to recent migrants from the ocean. In summary, we have evidence that suggests that river temperatures > 20 ºC are associated with 1) significant decreases in body size and expedited maturation timing, and 2) reproductive immaturity of Pacific lamprey. Is the observed maturation timing in nature the result of freshwater thermal regimes influencing maturation timing, as suggested by our lab study (plasticity) or a pre-programmed run and maturation timing that is adapted to, and synchronized with, cool (< 20 ºC) freshwater thermal regimes?

Lamprey outmigrant
Photo by Mike Gray

Approaches for monitoring Pacific lamprey spawning populations in a coastal Oregon stream

Abel Brumo, Confederated Tribes of Warm Springs

ABSTRACT — We evaluated two methods for assessing Pacific lamprey spawning populations (visual counts of spawning adults and redds) and one method for assessing larval production (emergent ammocoete counts from drift nets) in the South Fork Coquille River, Oregon in 2004 and 2005. All three methods generally provided similar pictures of timing, duration, and magnitude of spawning, including greater abundance in 2004 and seasonally bimodal spawning in 2005. We found a linear relationship between adult and redd counts, but a high redd to adult ratio that varied seasonally in both years. The high redd to adult ratio was attributed to short residence time in spawning areas and temperature/habitat-dependent differences in detection of adults, both of which can undermine adult count data. Redds had relatively longer persistence and larger numbers compared to adults and therefore may be a more practical survey method. However, variable redd shape, size, and age, as well as superimposition, presented significant counting errors. Sampling emergent ammocoetes in the drift allowed detection of low density, early and late season spawning and would be advantageous when surveys of spawning adults and redds are impractical due to river size, visibility, or access. Even when spawning surveys are practical, emergent ammocoete counts may be better for detecting and monitoring small populations. Disadvantages of ammocoete sampling include nighttime work hours, extra laboratory time, and difficulties with species identification. The general absence of a stock-recruit relationship in lampreys means adult and redd counts are poor predictors of larval production and emergent ammocoete abundance is a poor predictor of spawning abundance. The relationship breaks down because of variability in early survival, which can only be detected with data from both spawning surveys and larval production monitoring.

Pacific lamprey spawning
Photo by Abel Brumo

Recent and ongoing studies of diversity in western lampreys

Stewart Reid

ABSTRACT — The west coast of North America is home to an exceptionally diverse lamprey fauna with over one quarter of the world's nominal species, including representatives of *Entosphenus*, *Lampetra*, *Lethenteron* (Alaska) and *Tetrapleurodon* (Mexico). The large anadromous Pacific Lamprey, *E. tridentatus*, is broadly distributed along the coast from Baja California up to Alaska and down to Japan. However, recent genetic work has revealed only limited geographic divergence between North American and Japanese populations and little phylogenetic structure among populations along the entire west coast. In contrast, high levels of divergence and endemism are evident in most other western lamprey species (generally freshwater residents), with many limited to single drainages. In the Klamath drainage of southern Oregon, at least four of six native lampreys are endemic, all in the genus *Entosphenus*. Ecological diversity is also high within the Klamath fauna, which includes anadromous,

lacustrine, riverine and small stream-resident parasitic species, as well as non-parasitic brook lampreys. New evidence also suggests that the genus *Lampetra* may contain similar, currently unrecognized diversity. At present, only two nominal species of the genus *Lampetra* are acknowledged along the entire coastal region of California, Oregon and Washington - the River Lamprey, *L. ayresii*, and the Western Brook Lamprey (*Lampetra richardsoni*, sensu latu). However, preliminary genetic and morphological work (Docker, Boguski, Goodman and Reid) within the genus *Lampetra* suggests exceptionally high levels of cryptic diversity within these two broadly distributed species.

For biologists, recognition of the systematic and ecological diversity expressed by western lampreys is crucial not only for understanding their complex roles in aquatic systems, but also for ensuring that field data reflects biological realities, surveys accurately characterize the status of target species and restoration projects address the needs of all species. For managers, recognizing the diversity of western lampreys is crucial for refining strategic policies and developing proactive programs that will preserve all members of this unique fauna, which contributes so much to the natural and cultural heritage of our region.

Past, present and future activities of the Siletz Tribe regarding lamprey harvests, lamprey research and habitat restoration directed at lamprey populations

Stan van de Wetering, Confederated Tribes of Siletz Indians

SUMMARY — Stan van de Wetering is a fisheries biologist with the Confederated Tribes of Siletz. He touches on lamprey projects the Siletz have conducted in the past, current interests, and where they are going in the future with some cultural information mixed in. The Siletz became involved in lamprey research more than 10 years ago. They had 3 or 4 active years, faded out for a while, and are now getting back into lamprey research. Many of their projects are in areas outside of the town of Siletz. The aboriginal lands for the 27 bands that form the Confederated Tribes of Siletz encompass all of Western Oregon, west of the Cascade Ridge. The original coast reservation included a little over a million acres located in central to northern portion of the coast. They currently have a 15 county service area where tribal members live, work, hunt, fish, etc. Their historic land base and current service area are used to rationalize where funds and projects are located.

Historically, the annual lamprey harvest occurred in the spring. Families canned eels as a significant food source. Harvests included several hundred lamprey per night until the late 1970s to when it dropped off to very low numbers in the Siletz area. At that time, harvest then increased in the Willamette River where now all lamprey harvest occurs. Past lamprey projects included recording oral histories in the 1990s, juvenile outmigration timing and age structure, larval habitat preferences, larval distribution in the Alsea River Basin, and Siletz River spawning surveys. An overview of the results from these completed projects can be viewed on Stan's presentation.

The Siletz' current lamprey research focus is in the Siletz basin and the lower Willamette basin. Current efforts include non-point source pollution, Portland harbor superfund site looking at

lamprey toxicity levels and restoration, Siletz basin distribution and spawning surveys, and basic life history aspects of Willamette River populations. They saw a significant population decline in the 1970s and are asking what was going on. Primarily it was aggressive timber harvest, which included cutting riparian zones, sediment in the river in winter, cleaning streams with bull dozers, and applying chemicals. They are also a part of the Portland harbor superfund site group which is looking at how to deal with all the toxins that come into the project focus areas, specifically how to get them out of the river, restore lowland and upland habitat, and how to provide new, improved habitat for lamprey.

Sampling protocols and pitfalls: lessons from salmon and trout

Jason Dunham, US Geological Society

ABSTRACT — I provide an overview of pitfalls that commonly confound efforts to "standardize" protocols for stream fishes. Over the past 10 years, salmonid biologists have gained a rapidly increasing appreciation of the importance of measurement error (e.g., sampling efficiency and detectability) and sampling error. In particular, the scaling of sampling is a critical issue because it constrains how we can perceive patterns of abundance and distribution of a species. Fortunately the lessons learned from salmon and trout can be applied directly to the development of valid and standardized sampling protocols for lamprey.

Research in Western Oregon Panel Discussion

(Carl Schreck, Ben Clemens, Abel Brumo, Stewart Reid, Stan van de Wetering, Jason Dunham, Bianca Streif)

Question: Is the Umpqua River is going to be the site of any near future research?

Carl mentioned that biologists hope to be able to address a couple questions that relate to the ability of lamprey to pass over the dam, as well as establish the distribution of lamprey, the timing of their migration, and what type of habitat they utilized for their entire maturation.

Question: What type of research is being conducted in Eastern Oregon on lamprey? What species? What is known about them? Passage issues?

Bianca said that there is data showing that lamprey were in all of the drainages. They know that Pacific lamprey occurred historically in the John Day and Grand Ronde Rivers, and in the Imnaha (caught in trap last year). Very little monitoring is going on. There is no known distribution or abundance data. A summary of available data is on the USFWS website. Stewart added that researchers are trying to figure what species of lamprey are out there. No one has looked very hard. Abel said that another good person to talk to is Dave Close with the Umatilla who has done a lot of research on the John Day River.

Question: Recent decline coast-wide of anadromous lamprey, is the decline occurring in the same time period? Are they showing the same rate of decline and in the same time frame?

Stan said that according to anecdotal information and some dam counts, most declines are occurring in the 1970s. Ben added that there is a lot of gene flow between Pacific lamprey populations, so restoration in one place can help lamprey in a very different place.

Question: Is anyone working on large rivers using a deep water electrofishing method? Chris Prescott is looking for assistance and additional research on large river system studies of lamprey.

Stewart suggested talking with the Karuk Tribe fisheries department in the Klamath system.

Question: How do you distinguish the ammocoetes of Western brook and Pacific lamprey?

Abel said in his research they made a series of assumptions. They saw brook lamprey in the S. Coquille River. Other data suggests that Western brook lamprey are around 6-7mm when first emerge and Pacific lamprey are typically in the 8-9 mm range, so in their study they excluded any fish smaller than 8mm. On the whole they observed fewer adult Western brook lamprey spawning. Western brook have a relatively low fecundity compared to Pacific lamprey so they made the assumption that brook lamprey's influence on their larval sample was negligible compared to the high level of fecundity they saw for Pacific lamprey.

Stewart mentioned Damon's presentation in the afternoon that will be on larvae identification. At some sites Brook lamprey dominate so you cannot make assumptions. He has found that where people make estimates on Pacific lamprey, they go in and find they are almost entirely brook lamprey in the system.

Question: Can ammocoetes move upstream and downstream?

Stewart explained that the general sense is that they are blind, get up in the water, and are taken wherever the water takes them. He believes they are controlling when they are drifting and that we should not make the assumption that they are only moving downstream because they may be capable of moving upstream.

Bianca mentioned that they use plastic elastomeres for marking and tracking ammocoetes, but they don't know much about their substrate use.

Question: Have you seen adults do a similar burying behavior as ammocoetes?

Stan mentioned finding adults in old rotten gabions and areas where the substrate is rocky.

Question: More information about the proposed name change?

Stewart explained that Entosphenus is the original genus for Pacific and a number of other lamprey. Lampetra is a genus present in Europe and up and down the coast. The two genera have very distinctive morphologies. In 2003, a broad survey of parasitic lamprey by the American Fisheries Society recognized both as valid genera. However, they came out with their book recognizing that the morphology suggests two distinct genera but were holding off

while researchers finished the genetic process. Now the genetics is pretty much done, some of which has been published by Margaret Docker, which show very good genetic evidence that the two are distinct. If we try to lump all lamprey under one genus, we lose the sense of some of the diversity and history. In the next AFS book, Pacific lamprey will be published as Entosphenus.

Question: Any other characterizations of pathogens associated with either Pacific or Brook lamprey?

Ben observed individuals bleeding in the body cavity. One female individual tested positive for *Aeromonas*. A few other pathogens have been found.

Bianca mentioned that in Central Washington USFWS has been finding pathogens in lamprey in ponds.

Question: Is the lamprey decline associated with other species, such as the small mouth bass?

Abel stated that no targeted studies show trends in populations associated with the introduction of small mouth. An Umpqua study looked at stomach content and showed that ammocoetes make up a large portion of small mouth diet. All native predators typically bite their food before they swallow it. Ammocoetes have developed a protection skin secretion that they emit when they are stressed that causes a lot of native predators to spit them right out. However, invasive species just suck them down. Ammocoetes also come out at night and the striped bass is pretty active at night, so that may be another factor.

Stewart and Damon tested the hypothesis of noxious ammocoetes by eating live ones. He also noted that a lot of river lamprey in collections were taken out of the stomachs of striped bass

Jason mentioned that in a lot of rivers, the small mouth have replaced the pike minnow, so you have to look at the whole food web. Carl added that lamprey are preferred by marine mammals but with the population decline, they may have shifted their predation onto other species. Bianca stated that lamprey are definitely part of the whole ecosystem. A variety of fish and invertebrates feed on them, including sturgeon and sea lion. It is thought that historically during outmigration in fall, macropthalmia were fed on and acted as a barrier for salmonids. A reduction in lamprey may shift the focus of predators and create huge imbalances. Stan included that huge pulse of lamprey in the springtime also contribute a surge of nutrients.

Question: There is not a lot of money for monitoring—how do we go about starting monitoring programs?

Carl said to think of restoration as an experiment; when you go through the process, design some sort of monitoring and think of the time scale in which you may have to do monitoring. Think about restoring function versus pristine conditions. When you find an animal it may not be in its preferred habitat just in its available habitat.

Jason mentioned moving towards monitoring abundance. When the abundance is really available it is a composite of a lot of different processes and the result of decisions made by individuals to select certain habitats. For example: In an aquarium, when you put a little castle in there, that's a habitat modification; the first thing the fish do is go right in that castle. You don't have to wait 20 years to monitor abundance in your aquarium to see that it was used by the fish. Other ways to think about monitoring: there are other biological responses, think like a lamprey, not just about going about and monitoring abundance. There are a lot of other ways and you can get a good answer in a short amount of time, which is the biggest limitation in terms of restoration and monitoring.

Question: Is there a direct correlation between beaver ponds and rearing ponds for lamprey? With the monitoring the Beaver Advocacy Committee (five year research project) will be doing, could monitoring be an overlapping thing?

Stewart has found in beaver ponds that they never find ammocoetes. As soon as they get upstream of the ponds where there is some gradient, they find lots of ammocoetes. Abel said in the Deschutes Basin, they have found high densities of ammocoetes where beavers make piles of sticks they have chewed on. These areas are usually up in side areas and higher up in the basin with cold water. There is a potential that beaver would create good habitat, even just for trapping the sediment. Stan found ammocoetes around dams but not in the dams. They set up in the transitional current areas. Beaver create important floodplain habitat which contributes to healthier, more complex streams.

Funding Opportunities for Lamprey Conservation

OWEB Grants

Miriam Holtz, Oregon Watershed Enhancement Board (OWEB)

SUMMARY — Applications for OWEB grants are due April 21st. Grant funds can be applied towards restoration, technical assistance, project design, and watershed assessment projects.

Funding Local Projects

Bob Kinyon, Partnership for the Umpqua Rivers

ABSTRACT — The Partnership for the Umpqua Rivers, the major watershed council in the Umpqua Basin, has been implementing salmon restoration projects for the past 15 years. This non-profit 501 (c) 3 corporation has been very successful acquiring grant funding and local contributions to fund its infrastructure support and restoration work.

This presentation will highlight ten diverse projects and will describe the funding stream for each. Finally, it will describe the grant funding secured and pending for a proposed N. Umpqua Lamprey Study.

ODFW Funding Sources

Audrey Hatch, Oregon Department of Fish and Wildlife

ABSTRACT — Every state and six territories have created Wildlife Action Plans as a big-picture framework for conservation. The Oregon Conservation Strategy (Strategy) is Oregon's SWAP. The Strategy uses the best available science to create a broad vision and conceptual framework for long-term conservation of Oregon's native fish and wildlife, and is intended to be a broad framework for all of Oregon. The Strategy identified Pacific lamprey, Western brook lamprey, Upper Klamath Lake lamprey, Goose Lake lamprey, and Miller Lake lamprey as priority species, or "Strategy species". This raises the profile on research needs for Oregon's lamprey, and highlights the opportunity to use lamprey habitat requirements to inform management actions that support Strategy priorities. The Strategy brings some new funding opportunities for lamprey conservation and restoration, such as the State Wildlife Grants program administered by ODFW (funds from USFWS and based on annual appropriations); and collaborative ventures through organizations such as the Doris Duke Charitable Foundation. At the national level, funding opportunities can be pursued via Teaming with Wildlife, a broad coalition of fish and wildlife stakeholders. Our presentation will provide background information on the Strategy, and discuss some of the opportunities for funding conservation and restoration work through partnerships.

Pacific lamprey
Photo by Mike Gray

U.S. Fish and Wildlife Service Funding Opportunities for Lamprey Conservation

Vicki Finn, U.S. Fish and Wildlife Service

ABSTRACT — The U.S. Fish and Wildlife Service's Lamprey Conservation Initiative seeks to improve the status of lampreys by proactively engaging in collaborative conservation and problem solving. Our goals are to increase our knowledge of lamprey needs, improve communication rangewide, address threats, and restore habitat to thereby improve lamprey distribution and abundance. The Pacific Region of the Service has and will continue to use all appropriate funding sources to launch this Initiative and promote lamprey conservation. Funding sources include: National Fish and Wildlife Foundation grants and Service appropriated funds such as Fish Passage, Tribal Grants, Partners for Fish and Wildlife, Coastal Program, and other general accounts.

Oregon Sea Grant Competitive Research Grants

Mikell O'Mealy, Oregon Sea Grant

Mikell was not able to make it to the workshop. A handout summarizing Oregon Sea Grant funding is available under "Additional Resources".

Funding Opportunities for Lamprey Conservation Panel Discussion

(Bob Kinyon, Audrey Hatch, Vicki Finn)

Question: What is lamprugia?

Bob explained that lamprey + refugia = lamprugia. We talk a lot about refugia when talking about salmon, steelhead, and trout.

Question: Familiar dilemma about how much money goes to on-the-ground work, which is valuable, but there is virtually no support, no protocol for lamprey; how do we communicate this need for money for protocol work to those at the higher trophic level in the funding food chain?

Vicki replied that what they are trying to accomplish with the lamprey conservation initiative is to bring together all the information about lamprey and find out where there are gaps. When they have it in a conservation plan, it can be used to see those gaps. There is a need for the coalescing of forces, to identify those gaps so the decision makers can see, and everyone is seeing the same voids.

Audrey stated that with the completion of the state wildlife action plans, there is still a big gap with what's expected that the state agencies can provide as far as information. This gap will narrow now that there are outreach efforts out there. Communication with legislators and decision makers is important.

Bob said that they found that they need to learn more about how to incorporate science with on-the-ground stuff.

Tribal Cultural Values for Lamprey

Ron Reed, Karuk Tribe of California

SUMMARY — The Klamath River is home to the Hupa, Yurok, and Karuk tribes. It is also the home of the largest tribe in Oregon, the Klamath Tribes up in Chiloquin. It is a very important river, very diverse, with a lot of resources and a lot of responsibility. Tributaries of the Klamath, the Trinity, Scott, Shasta Rivers, are important systems impacted on different water uses, different land management practices, etc.

Ishi Pishi Falls is the site of their traditional dip net fishing. It is where they fish for Pacific lamprey, or eels, as they call them. His earliest memories include eating and fishing for them. It is an important area for the Karuk people and the center of the world. In the past, they picked eels off the rocks at this fishery. You would put eels in your bag or basket, as many as you needed, and then you'd go home to take care of them. Now with the decline in population, one of the contemporary methods utilized today is a replica of a traditional eel basket: made out of bicycle wheel frames and wire. They put the traps out in the migration corridor where lamprey

swim in and don't come out. They could potentially get up to 50-100 eels in one basket, but they don't usually because of the population decline. One eeler has been using baskets for a very long time and has very intrinsic values associated with lamprey. He helps the fisheries department with their research.

Setting eel baskets along the Middle Klamath River
Photo by Robin Petersen Lewis

Now they go down to the falls where they use a stick with a hook to reach out to the rocks and hook eels back to your children to pick up. Everything they do has to do with community involvement; the bigger the community you have the more successful you are going to be. Eel are very important to Karuk people, not only because they believe all living things have a right to life. Eels, in particular, have a very important place in tribal lore, history, and their future. Only a few people are able to build a smokehouse and distribute food and have food for themselves. It is an important component to their tradition, to their resources, etc.

Karuk manage their resources primarily by way of their ceremonies. The ceremonies dictate when they go out and how they manage the land, when they go to harvest and what they harvest, and they are very stringent in those laws. For instance, right now they can still catch steelhead and eat them; when the spring equinox arrives, at that point they are no longer able to fish for steelhead. Eels are the only fish they are allowed to harvest at that particular time of year. Obviously pre-contact, this time of year was very significant for survival. When all of your food is preserved and you start to get low on rations, then the eel becomes very important. Research suggests that lamprey eel have 5x the nutrient value of salmon. Going back 150 years, when you are starving along the bank and the eels start running, that's survival, that's how they lived. Important ceremonies and laws go along with resource management. Karuk have been here a long time, managed those creatures for a long time, and they are not going anywhere soon.

Down on the Klamath River, they are working on a hydroelectric licensing process for the last 7 years with PacifiCorp. In 2001, PacifiCorp ramped down the rate of flows from the dams from 1350 cfc to 750 cfc in 48 hours. This rapid down ramping disconnects the water from the habitat features along the river. They began looking for stranded anadromous fish, particularly coho, but came across a number of ammocoetes. This has a huge impact on eels because they are disconnected from the water table and are going to die. The ammocoetes are smothered, come up to the top, and then get baked by the sun. The Karuk got a little money from PacifiCorp to do some research. They use a square lamprey electroshocker that lowers down from a boat and shocks a 3x3 area. A dredge in back pulls in the ammocoetes from the shocked area to live well. They are trying to find out ammocoete preferred habitat.

He is here because of his children. The eel is a tribal trust species and he is working diligently at this resource because it is very important to tribal members and to the health of the river.

They are interested in the relationship between freshwater mussels, anadromous fish, and lamprey, particularly ammocoetes. There is an understanding that an intermediate host of the mussels are juvenile fish and that the preferred habitat of ammocoetes is below mussel beds. These three are traditional food base species that are very important to the health of the river and the diversity. The life cycle and connection of these three species is still understudied.

He is coming from a cultural perspective of the eel. He realizes the lamprey doesn't become important to science until it has a direct negative impact on one of the resources that society has placed up on that upper level of management.

The tribes aren't going anywhere. Eel are an important cultural resource food and the tribes are going to be here to the end so if anyone has ideas of what they can do collaboratively, let him know.

Stan van de Wetering, Confederated Tribes of Siletz Indians

SUMMARY — There were a million plus acres in the original reservation of the Confederated Tribe of the Siletz. The reservation disbanded fairly quickly and the land turned into allotment lands, set up for family fishing and wildlife areas. These allotment lands were typically lost in 1930s to back taxes. During the 1930-50s they lost a lot of the knowledge of what kinds of fish were harvested and where they harvested. Especially in the last 20 years or so, there just haven't been any lamprey to harvest. The last group to harvest lamprey are mostly tribal members in their 50s and 60s. Teenagers and even older tribal members are used to eating Big Macs and are not as open to traditional foods.

The methods used for harvesting lamprey depended on the stream, such as falls where lamprey congregated and they could reach out to grab them versus bigger mainstem systems where they probably had use traps. He envisions that a lot of different skills and methods were brought to the original population. When people talk about how their grandparents fished, they talk about pots out on riffles. From 50-100 years ago they used platforms. A family or multiple families built a fire; the men would do the fishing and throw eel up on the banks, while the women and children would bag them. Now they fish at Willamette Falls by hand and drive up in motor boats.

Eelers talk about day eels and night eels. He assumed the day eels might be spawners and the night eels might be the fresh ones coming in from the estuary. Eelers also mention going out eeling after the eel ants first came out. Eel ants are flying termites, which typically start flying around mid-May, after about 3-4 warm days. Siletz used to have a lot of spruce, but he's not sure if they are associated with termites.

The importance of the jump from steelhead to lamprey in the spring and how it filled a gap is true for all critters in the spring too. There used to be this huge pulse of flesh in the springtime.

Don Ivy, Coquille Indian Tribe

SUMMARY — The Coquille Tribe has a land share interest on tribes to the east, along the Coquille River, and into Northern California. Their interests range far and wide and with what everybody is doing everywhere else.

Their interest in lamprey got started, not with restoring an ancient, lost tradition, but trying to understand where the word "Coquille" comes from. The Coquille Tribe was restored 1989 and called themselves the Coquille Indians; previously they were a part of the Coos Bay Indians. The research they were doing trying to interpret archaeological sites put them into the realm of oral histories and oral traditions, ethnographies, written journals, military expeditions, all sorts of things. Finding out where Coquille comes from was important because they came across information that suggested that "Coquille" probably wasn't their name. "Coquille" is French for shell. In their research they came across an early account in a newspaper in 1854 that stated that "scoquel" is the Indian name of an eel which is found in this stream for which they take their name, generally called Coquille. This account was written by Perry Marple who came to the area in 1854 and established the first settlement. This was a documented account by a reliable informant calling the place "Coquille" or "Scoquel", meaning "eel". The challenge is trying to understand the name of a place, the name of the people, and the name of the thing they do there and try to link those with something that outside of Perry Marple's account would be helpful to understand an appreciation of language and the meaning of place. In their research into Athabaskan language, they came across speakers calling the place "eel". Research into Miluk language also found a word for "eel" and that word was applied to the area.

They had an inadvertent discovery in trying to search out the understanding from the source of a name of a place and a river. If the river was called eel, it's probably because it had eel in it. If three different language groups living in proximity to each other each had their own word for that place, it probably suggests there were lots of eels or lots of people who knew about those eels. It implies that there was abundance, which lots of people knew about, and that eel abounded over a large extent of that basin and to a large extent the landscape.

Lamprey don't show up in the archaeological record because there are no bones. The challenge is they have a lot of records of eel. The anthropological record, the ethnographies, what they had to say about the early and their elders at the turn of the century, a lot of material culture was virtually extinguished within a decade between 1850-70 due to contacts and war, all sorts of things. Plus, the people associated with material culture are virtually extinguished. Language gets lost, the meaning of things gets lost, and the artifacts themselves get lost.

He remembers as a young guy going to his grandmother's house and recalls that over the kitchen sink or behind the stove was a coat hanger with long eels being dried. He did not grow up eating them, but has them in his memory. Now, they are looking in records for anecdotes talking about when they were fishing or where or how they fished there. They are utilizing ethnographies from Harrington 1942. They are looking for clues in various sources of information and tying them together to other clues from other sources talking about these sorts of things and then tying them back to people who live in certain places.

Even if an anecdote is full of information, it is just a singular account, so you have to see what other people have to say and begin to confirm and verify. You begin to appreciate that even though it's oral tradition, even though it might sit outside of the paradigm of scientific inquiry and discipline, the fact of the matter is, when you test it against other testimonies it takes on a veracity that is very compelling and helps ground us in our understanding and our appreciation: 1)how important this resource was to the people who were utilizing it and 2)reaffirms their connections to other accounts and begin to ground them in their place and sense of responsibility to be aware of and take care of this particular species. In talking with groups around them, they begin to understand and appreciate what this fish is and how it operates.

In looking around in other books, as they talk about salmon and fishing and those sorts of things, you develop an appreciation of the diversity we have. In many instances, the early accounts that talk about salmon or talk about Indian fisheries, because of the locations or because of their unfamiliarity with the landscape and species, in some instances what may have been referred to as salmon, could have been lamprey. Some of those dried fish could have been from lamprey harvests in the springtime. Salmon came in September, so it doesn't account for an individual talking about salmon dried in March.

He introduced three ideas:
1) There is a significant amount of information that can still be obtained from oral tradition.
2) There is no way to disconnect the study of one species from another, to not think or consider that the study of any particular species compels us to think about the rest of the species that may have some relationship. In the abstract world of biology to think about lamprey and its importance to all sorts of things is to deny the significance of this fish to the people who live here. Its importance to humans has not changed and there is a responsibility to acknowledge that.
3) A lot of the success of lamprey recovery or science will be the results of the tribes. A lot of the actions and results have been the result of tribes becoming involved, due to inherent responsibility or because of the information they can bring to the party and arguably the resources too. Tribal folks have been here for 10,000 years or more and will be here until whenever that end is. Taking that long view allows them the context that is a little different than just getting this project done, just getting this grant delivered, just getting this research proposal, just getting this career. It is not to discourage these things, but include traditions as part of the equation. A return to tradition is not about making it exactly like their ancestors did, it's about understanding the principle, the value, and the purpose of their modern tools to understand and appreciate that species. It is an awareness of the leverage and importance of the tribes to assist in efforts and to become the driver, or to develop a common aim with values that go back to the tribes to sustain traditions or validate a point of view or otherwise help a tribe. The tribes can be the most helpful of partners.

Tribal Cultural Values for Lamprey Panel Discussion

(Ron Reed, Stan van de Wetering, Don Ivy, Amy Amoroso)

Comment: Something that has impressed him deeply about the tribes and their history is the number of tribal members and the reality of their sustainably functioning within the confines of fish and wildlife populations. Some of the most valuable information that they convene from the traditions of the elders is exactly how the tribes interacted with the rhythms of the migrations and various life cycles. He feels that the science can't address outside of functioning independent with getting that information—ancient and obvious with the people groups functioning quite well; encouragement to spread out the borders of inquiry, not just purely scientific, but cultural.

Ron said that he worked with Robin Petersen Lewis and started chipping away at that oral history with lamprey and looking at traditional ecological knowledge (TEK) which fits in with it well. It is intertwined with their bloodline, with their responsibility to mankind, and it revolves around their ceremonies. One of the biggest impacts to tribal communities is the tribal diversion; instead of him being home getting ready to go down to Ishi Pishi Falls to start fishing and telling the children, "hey, the buzzards came in two weeks ago or the dogwoods might be blooming, we hear the frogs outside". He tells them that, but there are whole different levels of management or teachings that are involved there. Instead of that, he is convincing his older children to go to school to become biologists, fish biologists or wildlife biologists. There is a cultural dynamic that has been replaced with this traditional management process. It has a very profound affect on their communities. It is the reason they are here; it is what he has been doing for the last five years, connecting the teaching of his people, his elders, to what is going on in the real management world today. How can we connect this impact with this resource right here to a tmdl or a water re-certification, etc?

Eeling at the mouth of the Klamath River
Photo by Robin Petersen Lewis

Thesis work mentioned by Ron Reed and conducted by Robin Petersen Lewis with the Yurok and Karuk tribes can be found under resources at the end of this document.

Interviews were conducted up in the Scott River valley, pretty far up in their ancestral territory where lamprey go and spawn. They were told by elders that when the old style farming went away there was a paradigm shift in the mid-1970s and the elders captured that. Now they could go further with their research and look into what is wrong with the population dynamics of the Pacific lamprey in the Klamath River Basin.

Comment: 10,000 years of forest management; it blows his mind that we don't take more advantage of what their people know; he is grateful for them coming here and sharing, an inspiration.

Don responded that it is not a blame game. Humans have not changed significantly in 10,000 years; who we are today is pretty much how we have been. The things that we do today, our habits, while they are more sophisticated, we are explorers. Our charge is to figure out how to exploit….he doesn't think their ancestors necessarily did that good of a job sometimes, he doesn't know. But the notion that they are remarkably different from us, he doesn't think is the truth. In terms of our need to exploit and to manipulate our resources, that is what we have always done as humans. His ancestors changed the landscape, intentionally or not, in the quest to exploit the resource to sustain themselves. Their ceremonies and fish traps had an impact on hydrology. The tricky part is to find a way to appreciate who we are, what we are up to with the creatures on the landscape, and be cautious and gentle. Find a way to be a careful, to fix some of the carelessness of the past without blaming anyone; "let's just make it right".

Question: Ron mentioned working with the kids and trying to get some of them to become biologists; what is going on more generally within your tribes to try to recruit people into the ranks, so to speak, that is part of the future? Is that a future role lamprey can play in the tribes and to be a nexus for recruiting more people to learn more about the natural world, looking back into traditions and also incorporating the "ology" concepts?

Ron replied it is important to try to scientifically validate the traditional management process perspective. He has asked enough questions, made enough statements to actually to grab the attention of some chief professors, some forest ecology professors down at UC Berkeley. The Karuk Tribe has formalized a forest management collaborative effort with UC Berkeley, based on a vision he's had for the last several years: knowing what their traditional management is and the benefits and consequences of that management process. It has been handed down generation-to-generation what those benefits are. But if he talks to a doctorate in forest ecology, and he tells them things that his grandparents or his mother said, they don't really seem to get it. UC Berkeley has done this work around the world with 40 indigenous groups and they get the indigenous concept of what they are speaking about. The reality is that the effort that is going to be put forth is to quantify not only tribal resource management, but also quantify in the same process the public trust resource management benefits. When they get on the same management plane, we can move forward together. The development of one process, the reintroduction of fire, is the primary management component of the Karuk people and in the Klamath River Basin. Berkeley is going to come in and help to create a comprehensive forest management plan to quantify this effort and they are soliciting this plan to already identified foundations so they can start tackling this big elephant in the room, the division between Western science and TEK.

Simultaneously, they are proposing to different foundations the opportunity to revitalize their culture—to get their children out there to four season camps the way they used to historically, to manage, harvest, and do their ceremonies in respect to the land. When they do create this next forest management paradigm shift, their children will be right there acknowledging scientifically the values of this process. This is his answer to his children and other tribes, that they still have everything their elders have given them in their past, they just need to reconnect them, they need to revitalize themselves in the management paradigm, in

the cultural paradigm. Therefore the tribes will come together with Western science to create a sustainable system that has not happened for about 150 years.

Stan remarked that more and more kids from the Siletz Tribe are going to college. They have an internship program, but have very little luck getting kids to want to come back.

Amy said that the Cow Creek are very committed to education by having a program that provides funding for tribal members for their education. The current chair wants people to be functioning, productive members of society. The challenge for Oregon tribes is the termination factor, so populations are not necessarily concentrated in one area because they weren't recognized as a tribe for so long that people dispersed. If you don't have a reservation, you don't have a place to come back to. They have funded tribal members to go to college and have provided a lot of volunteer opportunities on various projects, including fisheries.

Question: Noticed that there are a couple of rocks in eel traps and he heard someone mention them before. What is the purpose of the rocks or of lighter colored rocks?

Ron replied they are used as weight. In the stream, lamprey use a migration corridor as rocks get moved out of the way. One eeler puts rocks on the other side of his baskets to make the corridor change to make it impassable on the bottom of the river and the lamprey move toward the baskets; lamprey move along the bottom of the stream where there is less current.

Question: Comments on how to protect these last wilderness wild areas, such as those in the Umpqua National Forest?

Ron replied that fires are a primary management tool for local tribes. A lot of people on the left will say it is mother nature, let it go; it's been like that forever. Folks on the right say let's extract it, take it all, that's what it's there for. As tribal members they know there is a certain amount of preparation you have to do before you do anything. One of the main tribal laws that govern them as a people is that until you enhance a resource, you're not allowed to harvest that resource; in order to go in to harvest your acorns or medicinal plants, to harvest resources that are way back in the wild, you still manage those resources. Management of those upland areas creates life in the riparian corridor or traditional plants or acorns or wildlife or fisheries. By managing those areas, that's how you get mosaic type forests. If you preserve that today, you can't just go and run fire through those now because everything will burn up. They need treatments and to reintroduce fire. Fire needs to be looked at differently. He is not talking about hot fires, but cool burns.

Stan remarked that often times tribes get portrayed as having specific interests, like tribal members would be happiest if they had nice big old growth trees with salmon to fish. Most of whom he talks to want to harvest timber, want to make money, want to buy houses, feed their kids, want their kids to go to school, and want to fish (they don't care if hatchery or not). These are modern societies and wants and needs. People are interested in preserving culture as well as natural resources.

Don said that from a tribal perspective it is hard to get caught up in the debates over old growth forests. If they embrace their ancestry, it predates those trees and the context of old growth.

Lamprey Conservation and Restoration

Freshwater residence of adult Pacific lamprey

Stephanie Gunckel, Oregon Department of Fish and Wildlife

ABSTRACT — The freshwater residence of adult Pacific lamprey remains largely undescribed, particularly in Oregon coastal streams. We know lamprey hibernate over winter in freshwater, but location, duration and timing of hibernation is undocumented. To address this data gap, we used radio telemetry to investigate migration patterns, habitat use, timing, and duration of hibernation for adult lamprey in the Smith River (Umpqua River). Forty lamprey were tagged with radio transmitters at Smith River falls (river km 48) during May 2006 and tracked through the 2007 spawning season. Physical parameters describing habitat type, size, substrate, complexity, and velocity were measured for each hibernating individual at low flows in the late summer and high flows in early spring. All fish moved upstream following tagging, and the maximum distance moved was 80 km. We were able to follow three individuals to their spawning grounds during the following spring, the remaining fish were either prey for large predators, left the study area, or had tags that expired. In general, fish appear to hibernate by late summer (September) and hibernation continues through April, though some movement was associated with the first high flows of the winter.

Tagged lamprey
Photo by Mike Gray

Considering Pacific Lampreys when Implementing Instream Activities

Bianca Streif, U.S. Fish and Wildlife Service

ABSTRACT — Efforts to minimize negative effects to fish species during instream activities generally do not consider the life history characteristics of native non-game fish species, particularly lamprey. While there is still much to be learned about Pacific lamprey distribution, abundance, and status, the need for efforts to actively conserve lampreys is evident. The distribution of the Pacific lamprey has been reduced or eliminated in many river drainages along the west coast of Mexico and the United States. The purpose of this paper is to stimulate dialog and research to help identify methods to address instream project impacts and to raise awareness of the need to consider Pacific lampreys in project implementation.

Projects that alter passage, change flow hydraulics, alter stream substrates, and / or decrease habitat complexity can negatively affect lampreys. Of particular importance to lampreys are low velocity areas where young larvae (ammocoetes) live in the substrate as filter feeders for 3 to 7

years. Since several age classes of ammocoetes may congregate in high densities, a single dewatering event during construction activities may have a significant effect on a local lamprey population. Methods to reduce effects to the various life history stages of lampreys are just beginning to be investigated and developed. However, basic measures for lamprey conservation will also benefit other aquatic species by providing for a diversity of habitats and stream structure, and complex velocity distributions, while also appropriately modifying the duration and timing of instream actions.

Umpqua Basin lamprey data

Sam Moyers, Oregon Department of Fish and Wildlife

ABSTRACT — I will present Umpqua basin lamprey data collected through the years, this data includes Smith river falls lamprey trapping, known distribution of lamprey in the Umpqua and discussion of the North Umpqua lamprey radio telemetry project.

Morphological diversity among Pacific coast ammocoetes (Petromyzontidae)

Damon Goodman, U.S. Fish and Wildlife Service

ABSTRACT — The Pacific coast of North America is home to a diverse yet cryptic assemblage of native lampreys from three genera: *Entosphenus, Lampetra* and *Lethenteron*. Observations of declining populations from many sources have raised concern over the long term persistence of several of these Pacific coast lamprey species. This conservation concern was brought to the attention of the USFWS in 2003 with a petition to list four species under the Endangered Species Act. Although the petition was declined in a 90 day review, little quantitative evidence exists regarding their distribution and population dynamics. One factor limiting the study of these species is the lack of clear identification characteristics, particularly in the ammocoete stage. In this study we attempted to identify morphological characters able to consistently distinguish among genera of Pacific coast ammocoetes. We evaluated several variable morphological characters in ammocoetes from 16 collection localities distributed from central California to Alaska. Morphological identifications were then compared to identifications based on mitochondrial DNA sequence analysis and restriction fragment length polymorphism (RFLP) assays. Our analyses explore the relationships among the morphological characters, genetic identification, and geographic patterns.

Ammocoete in hand
Photo by Mike Gray

IT Support for Lamprey Data

Bruce Schmidt, Pacific States Marine Fisheries Commission

ABSTRACT — With interest in the population status of lampreys growing, now is an excellent opportunity to develop a consistent approach to collecting and using data on distribution, abundance and habitat condition. Since lampreys occur in habitats controlled by many different

entities, and since assessment of overall population status in western Oregon will require information from many sources, it would be most effective to develop a common approach for reporting occurrence, population status and habitat condition data. Work with other species has demonstrated that data management has sometimes been an afterthought, but if applied early in planning and implementing sampling programs, data management techniques can significantly enhance and simplify the use of data from multiple sources. The StreamNet Project, including its ODFW component, can assist biologists in developing a consistent approach to obtaining and managing such data.

The handout Bruce provided during the workshop is available under "Additional Resources".

Lamprey Conservation and Restoration Panel Discussion

(Stephanie Gunckel, Bianca Streif, Sam Moyers, Damon Goodman, Bruce Schmidt)

Question: What is a myomere?

Damon explained that a myomere is a body segment. Ammocoetes don't have many characters for identification and myomeres are something people can count.

Question: What range of ages can you use morphological characteristics for?

Damon said that they didn't evaluate in their study very small to first year to the largest ammocoetes. Their study focused on looking at 40mm and up.

Question: For the conference in general, I've noticed that they haven't touched on ocean conditions, predation, etc in relation to the general decline; is the main problem at sea versus on land?

Bianca responded that it depends on if talking in general about lamprey across the board. River and Pacific lamprey are the two anadromous species. In reviewing literature for the petition finding, they didn't find very much information on lamprey in the ocean. Pacific lamprey are found on occasion in the ocean far and deep. River lamprey stay close to the shore. She has thought about starting a study to gather information from commercial and recreational fishers: where they are finding them? how often? what do they find? It is a huge data gap. In the Columbia Basin researchers focus on the dams and blame everything on the dams, but they are not the whole answer to the question about the decline.

Damon said that they see north-south shifting of regimes in productivity with salmon. He wonders if with data on Pacific lamprey in the northern extent of its range, they would expect a similar response to regime change.

Question: Do we know enough about the non-anadromous lamprey species to say what their population trajectory has been and, if so, does it recall the same that you've seen for the anadromous species? First place to tease out potential ocean conditions if different species aren't affected by the ocean.

Stewart responded that it is a black hole off shore; they don't have the data.

Question: Has anyone studied stranding? Any evidence suggests that ammocoetes respond to decreases in flow and move out of the peripheral habitat?

Bianca said that they don't know. Don't dewater if you can avoid. All data about strandings is anecdotal. It's a big data gap.

Ammocoete in debris
Photo by Mike Gray

Question: Is there a way to dig sump holes and sink some type of collection device to salvage ammocoetes during dewatering?

Bianca responded that there are suggestions that ammocoetes move through the substrate not over the surface.

Question: Are there correlations with times and the hydrograph going up and down? Are flows and different water years affecting ammocoetes distribution?

Sam said that they collected most ammocoetes during higher flows.

Question: Did they do anything to monitor predators?

Stephanie responded that they haven't done anything about the predator idea other than observe it. They don't know how representative the fish they tagged are to the whole population so they don't know if their basic observations are saying that a large portion of the run is potentially being eaten before they get up to spawn and, if so, how are they subsisting with that degree of predation. When they repeat the study, they'd like to see if they can locate the fish early on to find out when the predation is happening. Their objective, though, is not to villainize the predators.

Question: Are you able to do anything about the proximity of species pairs?

Damon stated that genetic work cannot separate sympatric pairs. Where you have a river lamprey and a Western brook lamprey in the same drainage, they have not identified genetic differences between those pairs. Myomeres are found to be higher in parasitic species pairs and lower in the non-parasitic pairs. The genetic tool not there for us yet.

Question: How vulnerable are fish with tags in them?

Stephanie said that they have no data from their study. Carl Schreck and Dave Close have a study that says that there is less than a difference than she would have accepted. She has observed two tagged fish spawning, and an antenna getting wrapped up in gravel. Not sure if it makes them more vulnerable to predation.

Carl responded that their study is based in the laboratory. Have to ask yourself what you are really trying to learn from tags to weigh the potential impacts.

Question: During the collection of data, in the monitoring sense, people tend to use this data to focus down on specific reaches…are there any plans for more larger perspectives to coordinate between different watersheds or different states in regards to trying to figure out how populations of lamprey are doing? It is difficult to track trends when looking very specifically rather than very globally.

Bianca remarked that the point of the lamprey conservation initiative is to look at Pacific lamprey range-wide. The sub-group idea is to deal with that and get it started off on the right foot.

Damon said that they are still trying to get on the same page with proper identification for lamprey to species and to life stage. This is a huge first step to understanding what is going on.

Bruce emphasized thinking about how you are going to deal with the data and that it has to be connected with how the study is designed. To be able to make it work on a larger scale, you need to make the data comparable with common coding, common definition, and appropriate treatment of data. Even if a study is intended to look at a smaller scale, you need to design surveys with the larger scale in mind; then you can look at both local and global scales.

Question: The natural gas pipeline in the Umpqua system is happening during a time of year when water resources are very limited; is dewatering being addressed?

No.

Question: What is the correlation between microbial life and ammocoetes?

Bianca responded that there are no formal studies about the relationship between invertebrates, bio-plankton, and ammocoetes. South America may have some published data. It is important to understand the life history and ecological role of lamprey in our river systems, superfund sites and the contamination of lamprey as a food source, and how lamprey deal with contaminants in the substrate.

Damon remarked on the question about monitoring and protocol…sometimes when you deliver a protocol that nobody wants it is because it is not related to a decision that they are going to make. That decision has not been connected from a services point of view, from a decision based on listening. For example, from a tribe's point of view, what are lamprey? What is that decision, what is that scale? We need help with that if we are going to deliver a protocol that somebody cares about.

Bianca remarked that they are forming workgroups to start sifting through some of these answers and questions and look beyond some of these gaps. It is an opportunity to start with lamprey, which is not listed, so there is lots of flexibility and we have time to do it right.

Keynote Speaker

The keynote speaker was David Potte of USFWS who spoke on climate change and the implications for conservation and policy. His presentation can be viewed on-line with the other workshop presentations.

Winchester Dam Field Tour

During the field tour, participants were able to view and learn about the fish ladder at Winchester Dam. Lamprey come through the ladder during June and July. Lamprey counts have been recorded since 1965, with a high of 46,785 lamprey counted in 1966, followed by a dramatic decline. Last year, 156 lamprey came through the ladder, the highest recorded number in 13 years. They have plans to put a fish slide in but not in the ladder because of the aggressiveness of Chinook. The dam was built during the 1890s for power and a sawmill; it was only 4 feet high. The dam is presently 16 ft high. The fish ladder was built in the 1940s-50s. Originally, 8-10 hour fish counts were conducted by individuals. In 1992, a camera was installed to assist with 24 hour counts. The dam is a lumber structure with places for fish to go through. Currently, the dam is only utilized for recreational purposes. The fish ladder can be used to collect brood stock through a no-touch series of ladder closing control levels and bucket system. Upcoming plans include a live feed of the fish ladder on the internet using an underwater camera.

Speaker Bios and Contact Information

Brumo, Abel

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Abel Brumo received a Masters in Fisheries Science from Oregon State University in September 2006. Douglas Markle was his major advisor at OSU, and they collaborated on a variety of lamprey-related projects. Mr. Brumo's thesis focused on spawning, larval recruitment, and early life survival of Pacific lampreys in the South Fork Coquille River. He was an active member of both the Oregon Coast Lamprey Interest Group and Columbia River Lamprey Technical Workgroup from ~2003-2006. He has spoken about lamprey research and conservation at a variety of local, state, tribal, and national meetings and workshops. Currently, Mr. Brumo works for the Confederated Tribes of Warm Springs where he is leading a project to evaluate the

effectiveness of AbP-2 electro-shockers (lamprey specific) under varying environmental conditions and fish densities. He has also assisted with spawning and habitat surveys and radio-telemetry investigations on the Deschutes River and its Warm Springs Reservation tributaries. When Mr. Brumo is not pursuing lampreys, he enjoys traveling, fishing, backpacking, gardening, and brewing beer.

Clemens, Benjamin J.
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Ben Clemens is interested in the integrative and organismal biology of ancient and understudied fishes. He earned a Bachelor's in Biology and Earth Science (double major) at Central Michigan University in 1999, and a Master's in Zoology from the University of Guelph in Ontario, Canada in 2002. During 2002-2004 he worked for the Oregon Department of Fish and Wildlife's Smolt Monitoring Program before joining the Oregon Cooperative Fish and Wildlife Research Unit at OSU in 2004. During 2004-2005, Mr. Clemens' time was divided between a project on the Columbia River estuary where he assisted with constructing survival estimates and behavior analyses of smolts and led a tracking study on the distribution of adult Pacific lamprey in the Willamette Basin through aerial radio tracking. He started his Ph.D. work on lamprey life histories in 2006. Between 1999 and 2007, Mr. Clemens has given more than a dozen different presentations at various scientific meetings. He was also a teaching assistant in 6 higher level education courses, and has given 6 guest lectures at OSU. Mr. Clemens is a co-organizer and convener of a lamprey session being held at the International Fish Biology Congress in Portland, Oregon this summer, and his is an active member of the Columbia Basin Lamprey Technical Workgroup.

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Jason Dunham received his Ph.D. in Ecology Evolution and Conservation Biology from University of Nevada-Reno in 2007. His research interests include landscape ecology of aquatic ecosystems, conservation biology of focal species, ecology of natural disturbance, biological invasions, and monitoring. Dr. Dunham is current working in collaboration with Elwha-Klallam Tribe and other partners in the Elwha River restoration project (dam decommissioning) to develop sampling protocols to track pre- and post-project distributions of native lampreys.

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Vicki Finn serves as the U.S. Fish and Wildlife Service's (Service) Fisheries Restoration and Recovery Team Leader for the Pacific Region (OR, WA, ID, and HI). She has been with the Service for 19 years, working on a variety of fisheries and endangered species policy issues. She has a B.S. in biology from the College of William and Mary and an M.S./M.P.A. in Environmental Science and Public Affairs from Indiana University. In her present capacity, Ms. Finn facilitates and oversees recovery and habitat restoration efforts for aquatic species, such as Pacific salmon, bull trout, Pacific lamprey, Oregon chub, coastal cutthroat trout, and other native trout in the West. She is also the Pacific Region's coordinator for the National Fish Habitat Action Plan and represents the Pacific Region as part of the Western Native Trout Initiative. Previous positions include Chief of Endangered Species and Geographic Assistant Regional Director for Southern California. In the former, she was responsible for policy implementation of the federal Endangered Species Act in OR, WA, ID, CA, NV, and HI, including the Pacific Trust Territories. In the latter, she coordinated various Service programs in Southern California. In addition, Ms. Finn spent several years in the Service's Washington D.C. office, working on national budgetary and policy issues with a focus on Rocky Mountain endangered species issues. She has also served as the Service's policy representative on various Federal Columbia River Power System forums.

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Damon Goodman graduated with a master's in fish biology from Humboldt State University in 2006. Research for his master's degree emphasized the phylogeography and biology of lampreys. His primary research topic was focused on the mtDNA diversity among 81 populations of Pacific lampreys from British Columbia to central California. Currently he is involved in studying morphological diversity among lampreys along the coast with emphasis in the development of identification characteristics. Other lamprey related projects include investigation of habitat suitability criteria for lamprey ammocoetes, the use of lampreys as bioindicators for contamination, and the USFWS Pacific lamprey conservation initiative.

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Stephanie Gunckel has a Master's degree in fisheries from Oregon State University and has worked as a research biologist with the Oregon Department of Fish and Wildlife for the last 15

years. She primarily works with native inland trout on the eastside of the Cascade Mountains. However, for the past 5 years she has managed to keep her fingers in lamprey research, mostly focusing on Pacific and western brook lamprey in the Smith River, but also involved with Miller Lake Lamprey and other lesser known species on the eastside of the state.

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Audrey Hatch works for the Oregon Department of Fish and Wildlife. She is the monitoring coordinator and technical projects manager for the Oregon Conservation Strategy. Current projects include monitoring and data management to support the Conservation Strategy, and oversight of a statewide wildlife corridors project. Ms. Hatch has worked for the ODFW since 2004, and was part of the team that developed the Oregon Conservation Strategy. For the development of the Strategy, her emphasis was on aquatic habitats and species, including amphibians, invertebrates and fish. Ms. Hatch's educational background includes a Ph.D. in Zoology from Oregon State University. Her research focused on interactions among environmental stressors and their impacts on Oregon amphibians, including studies in the Willamette Valley and Cascade Mountains. Before moving to Oregon in 1997, Ms. Hatch worked as a consultant on lake ecology and stream ecotoxicology projects. She has a Masters degree in Environmental Science from Wright State University in Dayton Ohio, and Bachelor of Science in Biology from the University of North Texas in Denton, Texas.

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Don Ivy is the Cultural Services Program Coordinator for the Coquille (pronounced Ko-Kwell) Indian Tribe. Since 1997, he has done extensive work with federal and state agencies to protect archeological sites and traditional cultural places on the south coast, on both public and private lands; and has authored or co-authored several papers discussing cultural resource projects and issues. Prior to 1997, he consulted for Affiliated Tribes of NW Indians, Bureau of Indian Affairs, and various NW tribes in the areas of tribal community and economic planning and development; federal/tribal consultation; and tribal governmental organizational systems. Mr. Ivy also serves as Vice Chair of the Oregon Heritage Commission; a state-wide organization appointed by the Governor.

The Coquille Tribe Cultural Services Program facilitates and hosts a series of workshops during each year that emphasize and celebrate inter-tribal and inter-agency collaborations and partnerships for cultural resource stewardship; that also attempt to teach and appreciate traditional and modern cultural traditions pertinent to southern Oregon-northern California tribes.

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Bob Kinyon has been the executive director of the Partnership for the Umpqua Rivers for the past ten years. Prior to that, he held the same position on the watershed council in Coquille for 3 years. He retired from the U.S. Forest Service after serving 23 years in fire management, including 8 years in the smokejumper program. His last duty station was Baker City. Mr. Kinyon has also done mill work for Georgia Pacific and Marvin Windows plus he spent three years as a ticket agent for United Airlines. He served 4 1⁄2 years in the Air Force including one tour in Viet Nam. He has a forestry degree from SWOCC and graduated from Roseburg High School in 1963. Mr. Kinyon and his wife Judy will celebrate their 40th wedding anniversary on a cruise to Alaska in May. The Kinyons have two grown children and four grandchildren living in Bend.

Moyers, Sam
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Sam Moyers graduated from Oregon State in 1994 and began working for ODFW. His first brush with lampreys was working for the Salmonid Life-Cycle Monitoring project out of Newport . From Newport Mr. Moyers went to the Snake River to work as the ODFW transportation specialist at Little Goose Dam. As part of the bycatch through the fish collection facility numbers of lamprey marcrothalmia and various other nongame species were estimated daily. After Little Goose, he moved to Enterprise and worked on the Wallowa and Lostine rivers operating rotary screw traps for spring chinook. In 1999 Mr. Moyers moved to Roseburg to work on the South Umpqua fall chinook project and a variety of other jobs. In these other jobs (smolt traps, adult traps), he once again came in contact with lamprey. In 2000, after the Umpqua district made modifications to the Smith River falls adult trap they began to count adult pacific lamprey and continued this until Corvallis research began their radio telemetry project. In Roseburg, Mr. Moyers has been a habitat restoration biologist, assistant district fish biologist (inventory) and am currently a North Umpqua Hydro-mitigation biologist. In each of these positions he remained involved in pushing for lamprey research in the Umpqua basin.

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Mikell O'Mealy serves as a member of Oregon Sea Grant's Advisory Council and works at the Oregon Department of Environmental Quality on a variety of public health and environmental issues. She serves as DEQ's liaison to tribal nations, works with the Governor's Economic Revitalization Teams, coordinates environmental justice issues and manages a bi-state group working on the lower Columbia River. Prior to her current position, she worked on the Portland Harbor Superfund Site in the lower Willamette River, served for four years as Special Assistant

to the DEQ Director, and worked as a policy specialist for the Oregon Watershed Enhancement Board. Ms. O'Mealy also spent two years in Governor John Kitzhaber's Natural Resources Office in the late 1990s to help launch the Oregon Plan for Salmon and Watersheds, and she has enjoyed working as a co-instructor and author of watershed restoration courses and materials. Ms. O'Mealy has a M.S. in Marine Resource Management and a B.S. in Biology, both from Oregon State University.

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Stewart Reid is an independent fish biologist specializing in the biology and stewardship of western native fishes. Raised on the West Coast, he has worked with fishes for most of his life, ever since walking in the back door at Steinhart Aquarium at age thirteen. After living and studying freshwater fishes in Venezuela and marine fishes in Hawaii, he returned to the west and worked on endangered species in the Klamath and surrounding basins with the U.S. Fish and Wildlife Service for seven years before starting up a private organization, *Western Fishes,* specializing in the biology and conservation of native fishes. In 2004, he initiated the Western Lamprey Program, a collaborative effort among scientists and communities from the U.S., Mexico and Canada to promote our understanding of lampreys, their biology and their conservation. Current lamprey projects include systematic studies, development of field identification keys, phylogenetics, workshops, surveys, monitoring and outreach. Dr. Reid is active in regional and international scientific/conservation societies and is currently president of the Gilbert Ichthyological Society of northwestern fish biologists and the Desert Fishes Council.

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Bruce Schmidt has over 35 year experience in fisheries management, research and administration, and has worked with four state fish and wildlife agencies. He holds a BS in Fisheries Management and an MS in Fish and Wildlife Science, and has experience as a research biologist, planner, state fish chief, and research administrator. He is currently employed in the field of information management as Program Manager of the StreamNet Project with the Pacific States Marine Fisheries Commission. While he has no specific experience with lampreys, information systems are adaptable to all species.

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Dr. Carl Schreck has been researching the biology of fishes for over 35 years. He graduated from the University of California, Berkeley, in 1966 with an A.B. in Zoology. Following a year's study at Humboldt State University he attended Colorado State University where he received his M.S. in 1969 in Fisheries Science and his Ph.D. in 1972 in Physiology and Biophysics and Fisheries Science.

After receipt of his Ph.D. he was an Assistant Professor at Virginia Polytechnic Institute and State University. In 1975 he became the Assistant Leader of the Oregon Cooperative Fish and Wildlife Research Unit through the U.S. Fish and Wildlife Service and an Assistant Professor at Oregon State University. Two years later he became the Leader of that Unit and still serves in that capacity for the Biological Resources Division, U.S. Geological Survey where he is a Senior Scientist. He is also a Full Professor in the Department of Fisheries and Wildlife at OSU. He applies environmental physiology and behavior to address environmentally relevant questions. Dr. Schreck has received numerous professional recognitions and is a member of several scientific and management teams, organizations and committees. He has authored over 250 refereed scientific articles and books. A list is available upon request.

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Bianca Streif has worked for U.S. Fish & Wildlife Service (FWS) for the past ten years and the Natural Resources Conservation Service (NRCS) for the previous eight years. Her lamprey work includes being the FWS Chair for the rangewide Pacific Lamprey Conservation Initiative as well as various efforts to increase awareness and conservation to protect and restore lamprey populations as the lamprey lead for FWS Oregon. Ms. Streif participated in the Lamprey Symposium at the 2007 National AFS meeting and submitted a chapter for the upcoming AFS book, "Biology, Management and Conservation of Lampreys in North America". She presented a Lamprey Conservation Measures poster at the 2008 River Restoration Northwest Symposium and is chair of the Lamprey Symposium for this year's Western Division / Oregon AFS meeting. Ms. Streif also led the FWS 90-day Finding effort to respond to the petition to list western brook, river, and Pacific lampreys. Her other work includes being the bull trout coordinator for Oregon, Endangered Species issues and consultations, and river restoration issues.

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Stan van de Wetering has a BS in microbiology and an MS in Fisheries Science. He has spent the last 18 years working with various sorts of habitat research projects in Western Oregon. Most of his experience has involved juvenile salmonids and lamprey across the Oregon Coast range and in the Willamette Basin.

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WORKSHOP SPONSORS

A special thank you to all of our sponsors and for their generous contributions that helped to make this workshop a success:

ADDITIONAL RESOURCES

The following includes information about upcoming opportunities for further discussion and information sharing, as well as websites with additional lamprey resources. Any handouts provided during the workshop are included below.

If you would like to be included in a future lamprey listserve to facilitate the sharing of knowledge and resources, please contact Bianca Streif at bianca_streif@fws.gov.

Future Events

May 4-9, 2008, Portland, Oregon

Western Division & Oregon Chapter American Fisheries Society will host a symposium, "Getting Native Lampreys on the Management Radar"
http://www.wdafs.org/meet/meet.htm

May 15, 2008, Portland, Oregon

Columbia River Basin Pacific Lamprey Summit II
www.critfc.org

July 28-August 1, 2008, Portland, Oregon

8th International Congress on the Biology of Fish will host a symposium, "The Biology of Lampreys: From Ecology to Genomics"
http://www.fishbiologycongress.org/

Books

Biology, Management and Conservation of Lampreys in North America
Coming out in early 2009; Contact Shawn Chase, shawnc@scwa.ca.gov, or Larry Brown, lrbrown@usgs.gov, for more information.

Websites

The Pacific Lamprey Conservation Initiative, US Fish and Wildlife Service
www.fws.gov/pacific/fisheries/sp_habcon/lamprey/index.html

USFWS Lamprey Website
www.fws.gov/pacific/fisheries/sp_habcon/lamprey/index.html

Columbia River Basin Lamprey Technical Workgroup
www.fws.gov/columbiariver/lamprey.htm

The role of Traditional Ecological Knowledge in understanding a species and river system at risk: Pacific Lamprey in the Lower Klamath Basin, Robin Petersen Lewis
www.rsplewis.com/PetersenLewis_Klamath_LampreyTEK.pdf

Columbia River Inter-Tribal Fish Commission
www.critfc.org

American Fisheries Society
www.fisheries.org

Independent Multidisciplinary Science Team
www.fsl.orst.edu/imst/

Cooperative Registry of Conservation Actions
www.ConservationRegistry.org

Oregon Sea Grant Competitive Research Grants
http://seagrant.oregonstate.edu/funding

Climate Impacts Group, University of Washington/NOAA
http://cses.washington.edu/cig/
www.RealClimate.org

Handouts

Oregon Sea Grant Competitive Research Grants
Presented by Mikell O'Mealy, Oregon Sea Grant Advisory Council Member

The Oregon Sea Grant Program invites proposals for research on important marine and coastal issues from faculty of any institution of higher education in Oregon.[1] Proposals are entered into a highly competitive review and selection process described at seagrant.oregonstate.edu/funding/rfpcall.html.

Guidelines
An ideal Sea Grant proposal would apply the best science and an innovative approach to a well-defined coastal or marine problem or opportunity that is important to Oregon, the Pacific Northwest, and the nation. Successful Oregon Sea Grant proposals are likely to:

- show at least some significant progress within two years
- focus on outcomes and clearly show how the work would make a difference
- include meaningful collaboration with industry, agencies, communities, or other stakeholders
- have substantive evidence of co-funding or co-support from interested stakeholders
- request less than $90,000 per year and provide convincing justification for the funds
- involve regional or multi-institutional collaboration, especially that which involves one or more Sea Grant programs from other states
- include support for students

Funding
Funds available for Oregon Sea Grant's competitive grants program total about $1,000,000 in federal money each year. In the coming biennium, some of these funds have already been committed to continuing projects. Total funds available for new projects on February 1, 2008 are approximately $850,000. Proposals that request $90,000 or less per year will have a competitive advantage over those requiring more than $90,000 per year. Proposals requesting support for one or two years will have a competitive advantage over those seeking three years of support.

Decisions
Oregon Sea Grant uses different sets of criteria to evaluate proposals at various points in the decision process (see seagrant.oregonstate.edu/sgpubs/onlinepubs/g05001.html#AP3). Investigators are encouraged to review these criteria to better prepare competitive proposals.

Eligibility
Preliminary proposals may be submitted by the faculty of any public or private institution of higher education in Oregon, and awards will be made only through colleges and universities. A proposed project may involve researchers who are not university faculty, but the project's principal investigator must be a faculty member. With sufficient justification, individuals not associated with a college or university may serve as paid or unpaid consultants to the project's principal investigator.

For more information or assistance, please see seagrant.oregonstate.edu/funding/rfpcall.html, call the Sea Grant administrative office at (541) 737-2714, or e-mail at seagrant.admin@oregonstate.edu. Oregon Sea Grant is happy to help you in developing a proposal.

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[1] Under the laws governing NOAA/Sea Grant funding, Oregon Sea Grant is able to accept proposals only from researchers who are affiliated with institutions of higher education.

Managing Lamprey Data

Discussion at the Western Oregon Lamprey Workshop
February 26, 2008

Bruce Schmidt
StreamNet Program Manager
Pacific States Marine Fisheries Commission

Following are general suggestions for managing lamprey data so that the data can be readily shared among all involved agencies and offices, and can be combined into a consistent whole for wide scale analysis. The more of this that is already in place, the better. As a general rule, with more consistency in how everyone collects, inputs and stores their data, less work is required for compiling and analysis. With much of the needed sampling being new, this is an excellent opportunity to "get it right" in regard to how data are collected and used to benefit all.

1. Decide which types of data (specific metrics) need to be combined from multiple sources for wider scale analysis (will require agreeing on the key questions)

   These should be the common denominator types of data that everyone agrees are key to assessing lamprey population and habitat trends. Not all data need to be shared, and other data that are useful locally can remain with the originator.

2. Use consistent data definitions

   Data elements must conform to the same definitions in order to be shared and combined. For example: Counts of Large Woody Debris that result from different definitions (different length and diameter criteria) are not equivalent and can not be combined or translated.

3. Use a common data coding system

   Use of common code lists simplifies data sharing and compiling. If there are pre-existing code systems in use, agree to adopt one common system, or, develop a specific crosswalk for each to a common coding system. Don't create any <u>new</u> coding systems!

4. Develop and use common field data forms or, better yet, data loggers to record data

   Common field forms used across all agencies and offices greatly simplifies data capture, sharing and compilation. Use of electronic data capture in the field saves time, simplifies data compilation, and reduces errors by eliminating a subsequent data entry step.

5. Develop and use a common data entry screen or template

   If direct data entry is not used in the field, then it will be necessary to enter the data into electronic format from paper forms. Use of a single data entry template tool will simplify later data sharing and compiling. An Excel template can be used, but for data storage and management purposes, a data input form to a relational database (like Access) is preferred. Data can subsequently be output from the database into a spreadsheet for analysis.

6. Spreadsheets work well for local data storage and analysis, but develop and use a relational database to consolidate and manage data from multiple sources.

   Data management and data analysis are different functions. Relational databases are much more efficient and capable for managing large data sets from multiple sources. Even if spreadsheets are used in local offices, we recommend a database for compiling data from across agencies and multiple offices. Data can then be output in spreadsheet format for analysis in various statistical packages.

7. Describe the data sets so that others can use the information accurately and appropriately

   If data are going to be shared, they need to be described well enough so that others can understand what they mean. We recommend that a basic list of descriptive information be developed and included with each data set. Much of this information will be repetitive, so it becomes much easier to develop after the first time. This descriptive information is referred to as "metadata."

8. Take advantage of available IT tools

   Available data management tools would include: relational databases, data input templates, online data entry forms, electronic data transfer, automated output queries to data analysis packages, automated output reports, online data queries to sort / retrieve data, permissions to protect sensitive information, online archives, etc. Use existing tools, databases, formats, etc.

9. Decide how you prefer to deal with consolidating data for wide scale analysis

   Lamprey data will be generated at many locations. Decide whether the data should reside locally and be consolidated only if some need arises in the future, such as a listing petition, or, decide whether data should be consolidated from the beginning so that they can be used to analyze current trends on an ongoing basis. If the decision is to consolidate the data, decide on where the data should reside, who will be responsible for maintenance and updates, process to update, etc.

10. Form a working group.

    There are numerous ways to implement the above recommendations. One good way to decide on what will work best for working with lampreys would be to form a small work group with representatives from the interested parties gathered at this workshop. This will be especially helpful if new sampling efforts are to be implemented. It is easier to apply these recommendations as sampling programs are developed rather than to deal with disparate approaches later. Developing a data management plan would help evaluate these options.

11. Help is available

    The StreamNet Project (www.streamnet.org) has 20 years of experience compiling, standardizing, managing and disseminating data from multiple agencies, along with online archive and library functions, and can provide assistance.
    Contacts:
    Bruce Schmidt, StreamNet Program Manager, PSMFC (503) 595-3113
    Cedric Cooney, Oregon StreamNet Project Leader, ODFW (541) 757-4263, X 228

IN THE NEWS

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Learning about lampreys

ADAM PEARSON, apearson@newsreview.info
February 27, 2008

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CANYONVILLE — Little is understood about the lamprey, that parasitic eel-like fish that lurches over waterfalls with its sucking mouth, but a team of collaborators is determined to help recover its drastically fallen numbers.

Click to Enlarge

This image of a lamprey's mouth was taken by an Environmental Protection Agency employee.
Courtesy photo

On Tuesday at the Seven Feathers Hotel & Casino Convention Hall, about 140 tribal members, biologists, and varying agency officials gathered for the 2008 Western Oregon Lamprey Workshop, the first symposium of its kind in Oregon outside of the Columbia River system.

The goal, said a projects coordinator with the U.S. Fish and Wildlife Service, is to help the fish population recover for tribal cultural values and to help balance the ecosystem and keep the fish from being listed as threatened.

By tweaking recovery efforts made for salmon and steelhead in the past and present in a way that suits the lamprey's situation, lamprey numbers could improve "because you don't have the fear of the (Endangered Species Act) hanging over people's head," said Bianca Streif, projects coordinator at USFW in Portland.

A few years ago, petitioners were unsuccessful in persuading the USFW to list the Pacific lamprey as threatened, Streif said. But, she added, the agency recognizes the fish's decline over the decades and the public's lack of knowledge about it.

In September 2007, the USFW started the Pacific Lamprey Conservation Initiative, presided over by Streif, to restore lamprey populations and habitat.

According to the USFW, not much is known about Pacific lampreys' distribution numbers and habitat uses. But the agency hopes to develop a conservation plan that will help promote recovery partnerships for the fish.

Pacific lampreys are anadromous, just like salmon and steelhead. They are spawned in freshwater, spend their adult lives in the

So you know ...

WHO: Sponsors of the 2008 Western Oregon Lamprey Workshop:

ocean, and return to the streams where they were reared, typically between February and June, to spawn the next generation. At the time of migration, they range from 15 to 25 inches in size.

Native Americans valued lampreys as part of their diet because of their high-calorie content. A lamprey has "five times the nutrient value of salmon," said Ron Reed, a member of the Karuk Tribe of California.

The Cow Creek Band of the Umpqua Tribe of Indians, the Partnership for the Umpqua Rivers, the Oregon Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the Oregon Chapter of the American Fisheries Society, the U.S. Bureau of Land Management, the Oregon Watershed Enhancement Board, the Oregon Wildlife Heritage Foundation, Sea Grant Oregon, the U.S. Forest Service and the Confederated Tribes of Siletz Indians.

MORE INFORMATION: Visit the Fish and Wildlife Service Web site at http://www.fws.gov/pacific/fisheries/sp_habcon/lamprey/index.html

Reed said Native American tribes depended on the late winter migration of lampreys when other food supplies ran short: "Any type of food base is important to tribal members."

In fact, it is said most royal families of England were fond of lampreys, and King Henry I of England reportedly ate them to a "surfeit" and his death in 1135.

It is also said that seals and sea lions prefer lampreys over salmon and will target them if they are backed up against a dam, but that is largely speculation, said Stan van de Wetering, fisheries biologist for the Confederated Tribes of Siletz Indians. That is mainly because there are not enough lampreys around to study how seals and sea lions would react to the fish's abundance.

Ten years ago, only a handful of people could discuss lamprey populations authoritatively, van de Wetering said. But Indian tribes have been instrumental in garnering interest for the species from conservation groups and agencies charged with monitoring fish and wildlife.

On the East Coast and the Midwest, lampreys are loathed for their vampire-like ways, sucking the blood of freshwater fish, van de Wetering said.

Pacific lampreys, however, feed only when they are in the ocean.

Besides the anecdotal data tribes can provide that dates back to the 1970s, Winchester Dam on the North Umpqua River has the best annual records of migrating lamprey, van de Wetering said. And the Willamette Falls — where tens of thousands of lamprey used to gather — is the last remaining harvest site for tribes.

In 2000, the Umpqua District of the Oregon Department of Fish and Wildlife began capturing lampreys at Smith River Falls to count their numbers, said Sam Moyers, former assistant fish biologist on the district and now the North Umpqua River Hydropower Project mitigation biologist.

"I think we learned we had more than we thought we had," Moyers said of the study.

At Winchester Dam, where 24-hour fish-counting by camera and video tape began in 1991, Moyers said lampreys also slip underneath the log-crib structure rather than mainly using the fish ladder. The agency figured the slippery fish were going straight through the structure when it recently discovered many dead lamprey at the bottom of the dam when it was drained for repairs.

In 2007, ODFW counted 156 lampreys in the dam's ladder.

Amy Amoroso, director of natural resources for the Cow Creek Band of the Umpqua Tribe of Indians, said the annual lamprey migration number at Winchester Dam in the 1970s was in the tens of thousands.

Hopefully, Amoroso said, the lamprey workshop is the beginning of a multiple-agency effort to gather more data about the fish, and connect that information with people — including the tribes' cultural values.

"Why wait until a species is listed to do the work?" Amoroso said.

• You can reach reporter Adam Pearson at 957-4213 or by e-mail at apearson@newsreview.info.