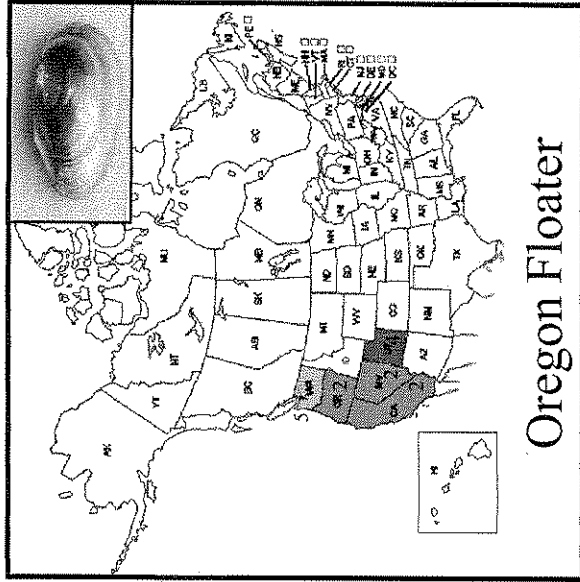
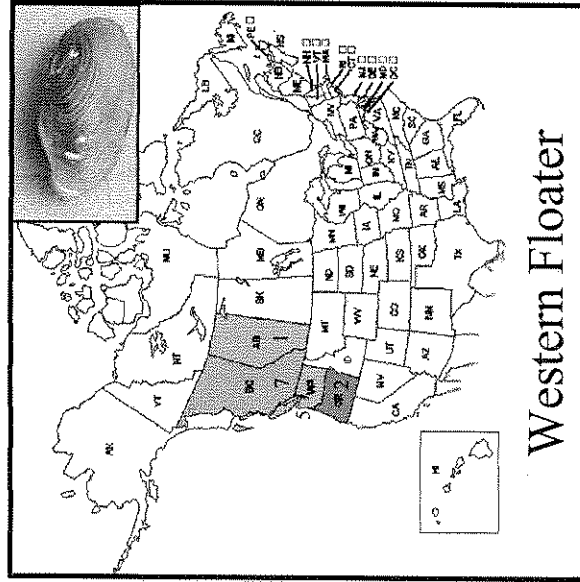


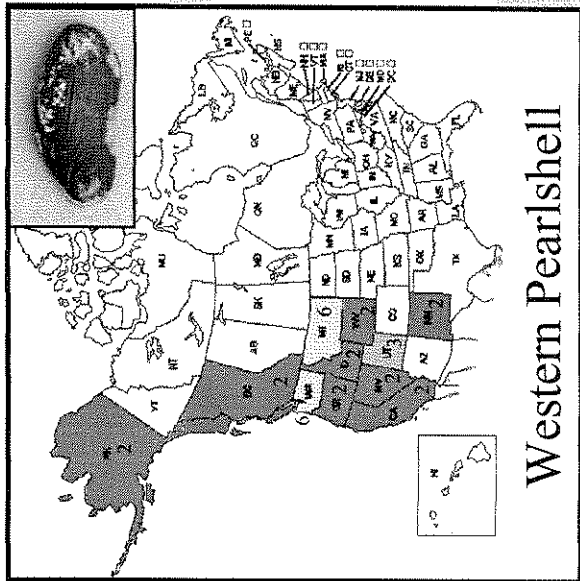
California Floater



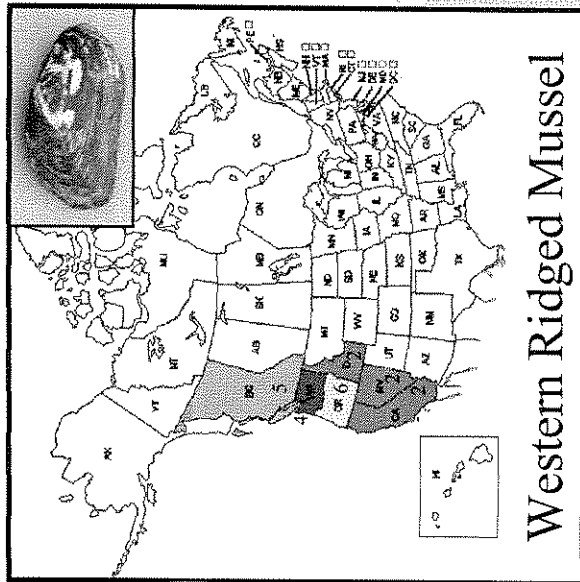
Oregon Floater



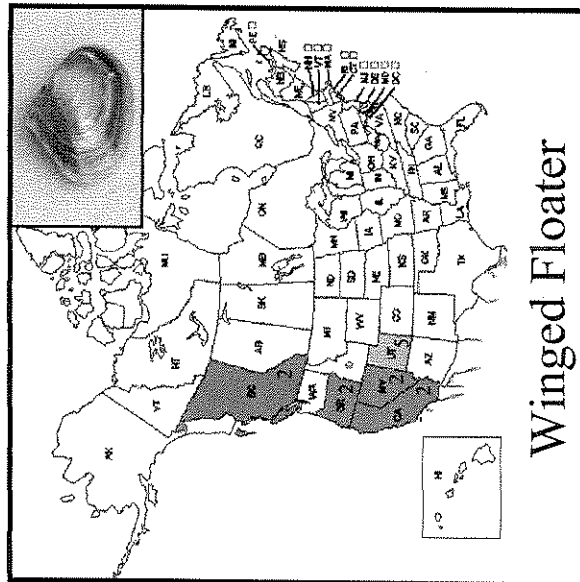
Western Floater



Western Pearlshell



Western Ridged Mussel



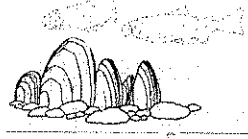
Winged Floater

- 1** Unrankable
- 2** Unranked
- 3** Possibly Extirpated
- 4** Critically Imperiled
- 5** Imperiled
- 6** Vulnerable
- 7** Apparently Secure

NatureServe. 2003. NatureServe Explorer. An online encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: October 31, 2003).

Hosted by the:

PACIFIC NORTHWEST NATIVE FRESHWATER MUSSEL WORKGROUP



Sponsored by:

U. S. Fish and Wildlife Service



Plum Creek Timber



Plum Creek

Water Tenders



Washington Department of Fish and Wildlife



The Oregon Chapter of the American Fisheries Society



How to Get to the Evergreen Olympia Campus:

Whether you are coming from the north or south, you can reach the campus this way:

1. Take Interstate 5 into Olympia.
2. Turn onto Highway 101 at Exit 104.
3. Go west on 101 North for three miles.
4. Take The Evergreen State College exit (on the right).
5. Go two miles north on the Evergreen Parkway to the campus entrance (on the left).

If you are coming from the west, this is your route:

1. Go east on 101 North toward Olympia.
2. Take the Aberdeen/Shelton exit (on the right).
3. Turn left at the stop sign onto 2nd Ave SW, which becomes Mud Bay Road.
4. Follow the road's curve to the right and continue up the hill.
5. At the hill's top, just beyond the overpass, turn left at The Evergreen State College exit.
6. Merge onto Evergreen Parkway.
7. Go two miles north to the campus entrance (on the left).

CAMPUS MAP KEY

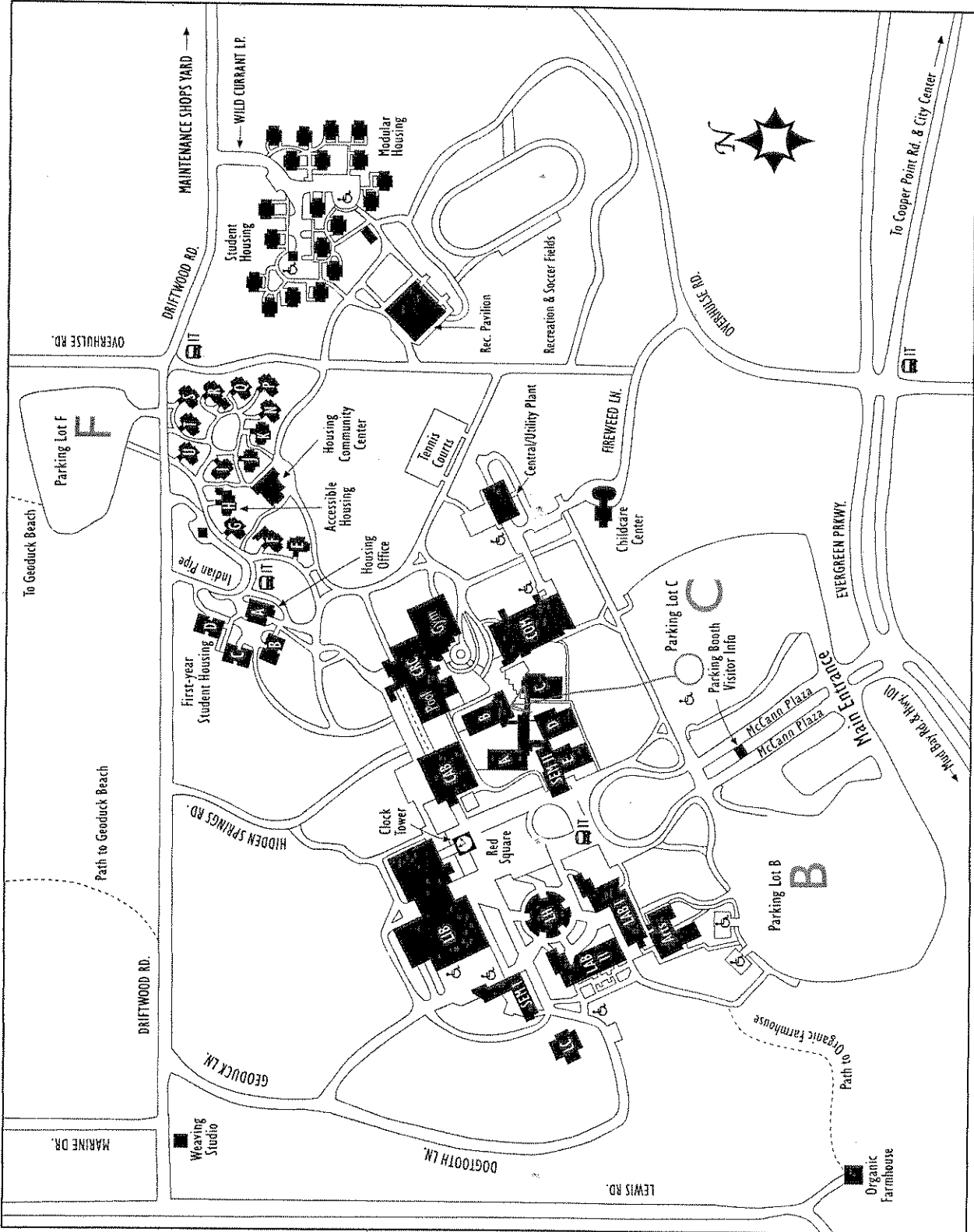
- Arts ... Arts Annex
- CAB ... College Activities Building
- COM ... Communications
- CRC ... Recreation Center
- IT ... IT bus top
- LAB I ... Arts and Sciences
- LAB II ... Arts and Sciences
- LC ... Longhouse
- LH ... Lecture Halls
- LIB ... Library
- SEM I ... Seminar I
- SEM II ... Seminar II

The Evergreen State College
 2700 Evergreen Parkway, NW
 Olympia, WA 98505

(360) 867-6000

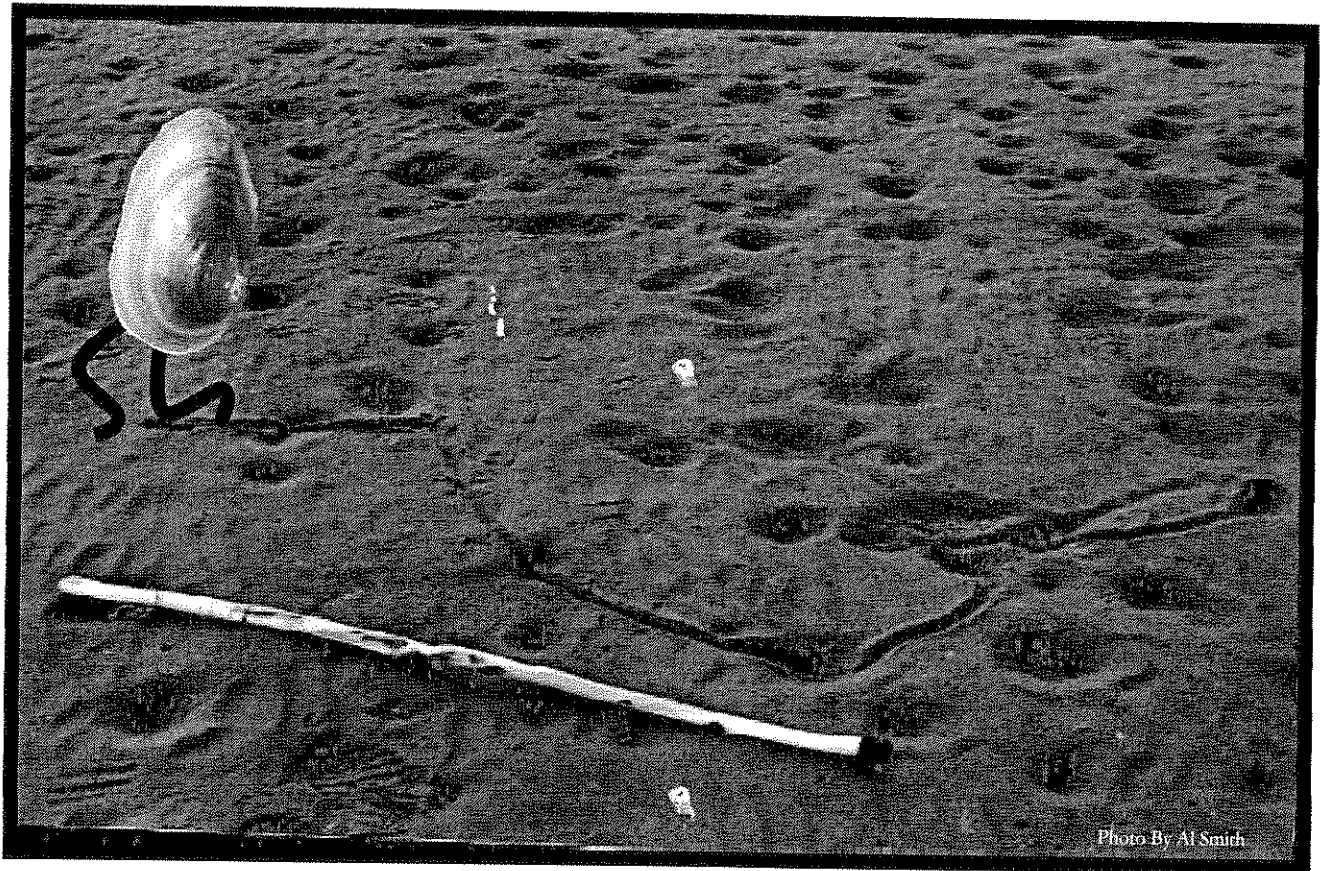
www.evergreen.edu

(not to scale)



3rd Annual
Freshwater Mussels of the Pacific Northwest
Symposium

"On the Trail of the Freshwater Mussel"



June 15th, 2005
The Evergreen State College
Olympia, WA

Symposium Agenda

- 8:30 - 9:00 Registration and Coffee
- 9:00 - 10:00 Keynote Address (Room 1105)
*Conservation and Ecology of the Freshwater Pearl Mussel,
Margaritifera margaritifera (L.).*
Lee Hastie, University of Aberdeen
- 10:00 - 10:15 Break
- 10:15 - 11:45 Workshop
Refer to your Group Workshop Schedule
- 11:45 - 12:45 Lunch
On your own
- 12:45 - 2:15 Workshop
Refer to your Group Workshop Schedule
- 2:15 - 3:00 Poster Session/Coffee: (Room 2105)
- 3:00 - 4:30 Workshop
Refer to your Group Workshop Schedule
- 4:30 - 5:00 Summation (Room 1105)
Rob Plotnikoff and John Fleckenstein, Pacific Northwest
Native Freshwater Mussel Workgroup
- Meeting Adjourned
- 6:00 - 8:00 After-Symposium Social
Ramada Governor House
621 Capitol Way S, Olympia
Phone: (360) 352-7700
Directions are located at the end of this program

Keynote Speaker

Lee Hastie

Lee Hastie has studied marine and fishery science (Heriot-Watt, 1983; Aberdeen 1990) and worked for 10 years in marine ecology, fisheries biology, aquaculture and conservation management in the North Atlantic and Indo-Pacific regions. He has written a number of journal articles on marine species, including cephalopods, deep-water caridean shrimps and tridacnid clams. In 1999 he completed a PhD on the conservation and ecology of endangered freshwater pearl mussels, *Margaritifera margaritifera* in Scotland. For 10 years, Lee has researched various aspects of *M. margaritifera* conservation, including reproductive biology, physical habitat requirements and host-fish relationships, and has written over 20 articles on the species. He is particularly interested in freshwater mussel cultivation and the effects of climate change on aquatic ecosystems and endangered species. Lee is currently a fisheries advisor for the UK government conservation agency JNCC and a research fellow at Aberdeen University.

Workshops and Conveners

Mussel Techniques

Mark Hove

Mark Hove has been enthusiastically studying native freshwater mussels for nearly two decades at Virginia Polytechnic Institute and State University, University of Minnesota, and Macalester College. Mark is currently studying mussel life history, demography, and habitat dynamics, and assists with mollusk curation at Minnesota's natural history museum, the Bell Museum of Natural History.

In this workshop Mark, along with Cynthia Tait of the Pacific Northwest Native Freshwater Mussel Workgroup, will discuss how to identify local mussels, methods to preserve animals or their tissue for select analysis, and estimate age of individuals. Cynthia will describe characters that distinguish each of the region's freshwater mussel species. Mark will discuss techniques to preserve entire mussels for museum use and collect tissue samples for genetic analysis. Mark will also discuss advantages and disadvantages of aging valves using external versus internal characters. Laboratory sessions will be held to practice techniques discussed during presentations.

Experimental Design

David Smith

David Smith is a biological statistician specializing in sampling designs for rare and clustered populations. He has been working on the problem of sampling to assess freshwater mussel populations for about 10 years and has authored or coauthored 10 reports related to that subject, including journal articles, an American Fisheries Society monograph, and a book chapter. He initially became interested in statistics and

estimation when he went to a carnival as a kid and tried to guess the number of beans in a mason jar. He did not win that time, but would like a second chance.

Designing an effective survey of freshwater mussel populations begins with clear objectives. This workshop on sampling freshwater mussel populations will be organized by common objectives. Appropriate sampling approaches will be reviewed and advantages and disadvantages will be discussed. The importance of using methods that explicitly account for sampling error and detectability will be emphasized. At the end of the workshop participants should have a working knowledge of several methods that they could apply effectively in their studies of freshwater mussel populations.

Ecology and Outreach **Kurt Welke**

Kurt's road diverged onto the mussel path in 1988 when he took a job in Prairie du Chien Wi, the mecca of freshwater mussel biodiversity of the Upper Mississippi River. He was smitten by the shells: their beauty and fascinating biology intrigued him and he became an unabashed advocate for this fauna. Kurt has had the privilege of participating in several regional and national teams that have charted policy and recovery of unionids. He remains committed to being a shell biologist - working from the river bottom to the podium to preserve these animals, their habitats, and the physical and biological processes that sustain both.

Kurt has been told that he is good at teaching and that his demeanor engages people. Learning stimulates him and he likes to know what makes other peoples' worlds spin. He is very much a "people person" and he hopes to use those skills today to instruct folks on how to get the "mussel message" or messages (and there are lots of them) across to constituents, partners, and clientele. Kurt will be sharing what he has found to work in the world of Outreach and will pass along some tools to help you succeed, save you some time, and avoid having to re-invent the wheel.

Technical Posters

Propagation and culture of endangered juvenile mussels (Unionidae) at the Freshwater Mollusk Conservation Center, Virginia Tech.

Jess W. Jones, Richard J. Neves, Rachel A. Mair, and William F. Henley
Virginia Cooperative Fish & Wildlife Research Unit, Department of Fisheries and
Wildlife Sciences, Virginia Tech, Blacksburg, VA 24061

Presenter: Dick Neves, mussel@vt.edu

North America contains the greatest diversity of freshwater mussels in the world, approximately 300 species; however, this family of mollusks is the most imperiled taxon in the United States. Already, 35 species are presumed extinct and 70 species are listed as endangered or threatened. Without immediate efforts to recover federally protected species in watersheds throughout the country, the extinction of additional species is likely. Biologists at the Freshwater Mollusk Conservation Center at Virginia Tech have developed methods to produce and culture endangered juvenile mussels. The Tennessee Wildlife Resources Agency, U.S. Fish and Wildlife Service, Virginia Department of Game and Inland Fisheries, and Virginia Tech have entered into a cooperative program to fund the production, culture, and release of large numbers of endangered juvenile mussels into rivers in Tennessee and Virginia. The goal of this project is to augment natural reproduction at sites with these species and to release juvenile mussels at historic sites within rivers to expand population ranges. Between 1998 and 2003, nearly 400,000 juvenile mussels of 11 endangered mussel species were released into the Big South Fork, Cumberland, Clinch, Powell and Hiwassee rivers. These rivers contain sufficient broodstock and suitable habitat to augment and re-establish populations of rare mussels. Juvenile mussels are typically between 700-1200 μm long and 60 days old at the time of their release into the rivers. Monitoring efforts at release sites have documented variable survival of juveniles. For example, survival of released juveniles of *E. capsaeformis* in the Clinch River has been documented, and augmentation efforts in the river appear successful. In contrast, released juveniles of the same species in the Powell River have shown no signs of survival. Propagation is now a viable tool to implement recovery of federally listed mussel species.

Washington Terrestrial Slugs and Snails (Mollusca: Gastropoda: Pulmonata)

Casey H. Richart, William P. Leonard, and Marc P. Hayes
Forests and Fish Section, Science Division, Washington Department of Fish and Wildlife,
Olympia, WA

Presenter: Casey H. Richart, 360-902-2541; pileated@hotmail.com

Current data indicate that Washington State harbors 106 recognized species of terrestrial gastropods that represent 3 orders, 25 families, and 50 genera. Of this assemblage, 76 species (21 families, 40 genera) possess clearly visible shells (termed snails); the

remaining 30 species (5 families, 11 genera) lack significant shell development (termed slugs). Eighty-two species (66 snails, 16 slugs) representing 3 orders, 20 families, and 36 genera are native; the remaining 24 species (10 snails, 14 slugs) representing 1 order, 8 families, and 11 genera are exotic. Due to their recent discovery, 8 additional terrestrial gastropods are not yet named and their validity remains questionable. Further, 4 other terrestrial gastropods (3 of them introduced) may occur in the state but difficult identification either produced dubious identifications or make presence uncertain. Terrestrial gastropods are an important and often unrecognized component of Washington's ecosystems. Microsnails (< 5 mm in diameter) have been recorded in western forests at densities up to 38,690,000 individuals/ha and up to 27 species have been located within a km². Terrestrial gastropods are ubiquitous and occur in every terrestrial habitat in Washington other than those under permanent snow and ice. They represent critical elements of terrestrial food webs, especially the heavily detritivore-based food webs in Pacific Northwest forest systems. Of the 82 native species in Washington State, 52 include detritus as part of their diet, 43 graze living vegetation, 19 are known to eat fungi, and 7 eat or occasionally eat other slugs and snails. Additionally, terrestrial gastropods are known prey for snakes, salamanders, many birds and mammals, beetles, and even other snails. Some species, like the northwestern garter snake (*Thamophis ordinoides*), the sharptail snake (*Contia tenuis*), and snail-eating beetles (*Scaphinotus*), are obligate, or near obligate, molluscivores. Terrestrial gastropods also contribute importantly to the dispersal of fungal spores and mycelia, and the seeds of selected plants; and may provide other ecosystem services that have not yet been identified. This presentation will synopsise terrestrial gastropod biology, highlighting the diverse opportunities that exist for their study in the Pacific Northwest.

Freshwater Mussel Surveys Conducted on Four Urban Streams in Clark County WA

Frank Staller¹, Jamie Glasgow¹, and Jen Poirier²

¹Washington Trout, 15629 Main Street N.E., Duvall, WA. 98019, 360-866-4669

²U.S. Fish and Wildlife Service, Columbia River Fisheries Program Office, 1211 SE Cardinal Ct, Vancouver, WA 98683

Presenter: Jen Poirier, 360-604-2500; Jennifer_Poirier@fws.gov

During summer 2004, Washington Trout and the U.S. Fish and Wildlife Service, Columbia River Fisheries Program office conducted freshwater mussel surveys on four southwestern Washington streams within the Columbia River Basin in Clark County Washington. The objectives of this study were to determine the presence or absence of freshwater mussel populations, to establish the current distribution, density, and species composition of freshwater mussels, and to identify the physical habitat preferences of freshwater mussels populating four urban streams. Field crews surveyed portions of mainstem Gee Creek, Salmon Creek, Burnt Bridge Creek, Gibbons Creek, and Campen Creek (a tributary to Gibbons Creek). The four study streams are located in a rapidly developing portion of Clark County, where rural and agricultural lands are actively being

transitioned into suburban and urban development. The study was conducted in three stages. The first stage maximized survey efficiency on each stream by locating and prioritizing those reaches most likely to support mussel populations (areas with gravel-dominated substrates, moderate channel gradients (less than 7%), adequate flows, and heterogeneous pool-riffle complexes). During stage two, high priority reaches identified in phase one were quickly surveyed to identify the presence or absence of mussels, and to establish a basic habitat characterization. In stage three, field crews randomly selected locations within a number of high priority reaches identified as containing mussels, and performed an intensive census count within a twenty meter survey transect. This study provides a baseline characterization of freshwater mussel populations in four Clark County streams. It reports mussel bed location, species composition (primarily *Margaritifera falcata*), density, population age structure, and physical habitat preferences against which future surveys can be compared to document changes in the current health of mussel populations, the streams, and surrounding ecosystem.

Survey and Assessments of Native Freshwater Mussels along the Hanford Reach of the Columbia River

Brett Tiller¹, Matt Bleich², Ian Welch², Gerald Turner², James Bernhard², and David Geist²

¹ Environmental Assessment Services LLC, P.O. Box 265, Richland, WA 99352

² Pacific Northwest National Laboratory, P.O. Box 999, Richland, WA 99352

Presenter: Brett Tiller, 509-375-1481; bretttiller@charter.net

The Hanford Reach is one of the last free-flowing portions of the Columbia River and contains substrate characteristics (cobble, gravel, sand/silt) suitable for a number of the native freshwater mussels known to exist in the Pacific Northwest. Because information is lacking concerning the number and distribution of native mussel species along the main-stem of the Columbia River, the goal of this study was to provide an initial assessment of the freshwater mussel species (Families: Margaritiferidae and Unionidae) present in the Reach, their relative densities, and distribution. A total of 52 transects were surveyed within the study region, which encompasses 90km (56 mi.) of the Columbia River between Priest Rapids dam and the City of Richland. Surveys were conducted by snorkeling at standard water depths of 1.0 to 2.0 meters below the low-water mark to identify mussel species and record the number of individuals observed per transect. Estimates of mussel densities were summarized with respect to substrate size, substrate embeddedness, relative abundance of aquatic vegetation, and large-scale geomorphic/hydrologic characteristics along the Hanford Reach. A total of 201 live native mussel specimens were observed and measured. Three species (*Anodonta* spp.) belonging to the Unionidae family were common in certain sand/silt substrate habitats along the Hanford Reach. The greatest mussel densities were observed in areas where the aquatic vegetation (macrophytes) was sparse but present. The two most common species, the western floater (*A. kennerlyi*) and the Oregon floater (*A. oregonensis*) were found in virtually all substrate types sampled (sand/silt, pebble, and

cobble) provided substrates exhibited some degree of embeddedness (matrix substrate). The California floater (*A. californiensis*) was found only in a few areas sampled where river velocities were relatively low and substrates were fine sands/silts—slough/backwater habitats that comprise approximately 1.5% of the riverine environment along the Hanford Reach. Several shells of the western pearlshell mussel (*Margaritifera falcata*) were found that appeared recently dead (as indicated by coloration of the shell and integrity of the hinge ligaments) at two sites. However, this species appears to be largely absent from the Hanford Reach. This work was performed by Pacific Northwest National Laboratory, for the U.S. Department of Energy under Contract DE-AC06 - 76RL01830.

About the Pacific Northwest Native Freshwater Mussel Workgroup

History

The status of the seven species of freshwater mussels native to the Pacific Northwest has received very little attention, despite the fact that freshwater mussels in general are considered the most endangered group of animals in North America. On February 19, 2003, a workshop on freshwater mussels was held in Vancouver, Washington that consisted of presented papers and a panel discussion. The purpose of the workshop was to initiate discussion on the regional population status of freshwater mussels. The workshop was attended by 91 participants of very diverse backgrounds. From this meeting, the Pacific Northwest native Freshwater Mussel Workgroup was founded.

Purpose

The purpose of the Workgroup is to provide an open forum for discussions focusing on native freshwater mussels, dissemination of related information, and to provide guidance on integrated planning of mussel research, management, and education. The goal of the Workgroup is to ensure that freshwater mussel research, management, and educational activities are coordinated, prioritized, and are consistent with information needs identified.

Composition

Current representation includes: Bureau of Land Management, Confederated Tribes of the Umatilla Indian Reservation, Deixis Consultants, Jamestown S'klallam Tribe, Ocean Works International Ltd, Portland State University, Snohomish County, The Nature Conservancy, U. S. Fish and Wildlife Service, University of Washington, Washington Department of Ecology, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, Washington Trout, Water Tenders, Xerces Society, and retired biologists.

Process

The Workgroup holds an annual freshwater mussel symposium, which may be attended by anyone, for the purpose of reviewing the state of mussel research, management, and education. The location of the annual symposium rotates throughout the Pacific Northwest.

Members of the Workgroup meet at least four times per year (either in person, via teleconference, or by proxy) to review projects, coordinate work, discuss research priorities, and conduct other associated activities. Workgroup meeting locations rotate throughout the Pacific Northwest.

Directions to Social from Evergreen State College

Driving Directions:

1. Start out going NORTH toward EVERGREEN PKWY NW. (0.01 miles)
 2. Turn LEFT onto EVERGREEN PKWY NW. (1.98 miles)
 3. Merge onto US-101 S. (3.46 miles)
 4. Merge onto I-5 N via the exit on the LEFT toward OLYMPIA/SEATTLE. (1.14 miles)
 5. Take EXIT 105 toward STATE CAPITOL/CITY CENTER. (0.22 miles)
 6. Turn SLIGHT LEFT onto HENDERSON BLVD SE. (0.06 miles)
 7. Stay STRAIGHT to go onto 14TH AVE SE. (0.56 miles)
 8. Turn RIGHT onto CAPITOL WAY S. (0.52 miles)
 9. End at 621 Capitol Way S Olympia, WA 98501-1205 US
- Total Estimated Time: 12 minutes
Total Distance: 7.96 miles

