

a bridge for Salmon

Newsletter - Volume I - September 2004

REED

REED is the acronym for Restoring the Estuary and Ecosystem of Deer Harbor. It is a joint venture consisting of property owners, Deer Harbor community members, non-profit organizations, scientists, the Samish Indian Nation, and local, state, and federal governments all of who share a collective vision to study the estuary of Deer Harbor in an effort to understand its past ecological functions. Viewing the ecosystem from a historical perspective will shed light onto its potential to function as a vital and healthy ecosystem. The goal of this Salmon Recovery Funding Board (SRFB) grant is to paint the ecological and human picture clearer. REED seeks to integrate restoration measures into the fabric of our lives so that marine species, such as Dungeness crab, salmon, herring, surf smelt, sand lance, and the habitats that support this important food chain can co-exist thereby ensuring that Deer Harbor is a place we can all be proud of.

The scientific team is made up of geologists, engineers, hydrologists, an oceanographer, eelgrass habitat expert, botanists, ethnohistorians, salmon biologists and habitat experts all with strong ties to the San Juans. The articles that follow reflect the work so far completed and the plans for the future with regards to this Salmon Recovery Funding Board sponsored project.

Restoring the Estuary Ecosystem of Deer Harbor

SPIRIT OF DEER HARBOR

By BOB CONNOR, CHAIRMAN
DEER HARBOR HAMLET PLANNING AND REVIEW COMMITTEE

After years of thoughtful, consensus-driven comprehensive investigation, the community of Deer Harbor has achieved a plan that has been acclaimed by neighboring communities and governmental agencies. Most noteworthy, this plan embodies the collective spirit of Deer Harbor; and by so doing, drives us forward to achieve its objectives. The Deer Harbor Hamlet Comprehensive Plan identifies the estuary as an "indispensable provider of life"



The Deer Harbor Hamlet Comprehensive Plan identifies the estuary as an "indispensable provider of life"...

and as an important natural resource and habitat feature to be protected and preserved. The Plan also points out that "in the near future, planning must begin for replacing the existing slough bridge." A task force, called REED, was formed by Ken Brown and Isabelle Athmann, property owners Bob and Meg Connor, and the Inn on Orcas Island, to restore the Deer Harbor estuarine system.

One of the missions of the REED Project is to understand the current health of the estuary and the factors that brought it to its present condition. Through modern scientifically driven methods, we will learn what revisions would improve this vital ecosystem. Native people throughout the world and throughout history have actively managed their natural environment. We must also take on this paramount responsibility for the mutual benefit of all inhabitants of this magnificent place now and in the future.

We ask you to take an active role in your community to learn where we are now, and to help create and preserve those qualities of Deer Harbor to which we collectively aspire. Study this newsletter. Open your hearts to its ideals and take steps toward furthering the 'Spirit of Deer

SALMON RECOVERY FUNDING BOARD AND REED

By MARG DUBOISKI, SRFB PROJECT MANAGER

The Washington State Salmon Recovery Funding Board (SRFB) loves these types of projects – local communities working together to solve a habitat restoration need. The REED project is an excellent example of collaboration between the Deer Harbor hamlet, its surrounding landowners, and the Samish Indian Tribe. The people involved are conducting a thorough historical analysis of the estuary and bay prior to developing the engineering and design plans for a new bridge.

The objectives are to restore as much of the historical estuary as possible, to improve fish passage for both juvenile and adult salmon, and to increase native aquatic vegetation. The Deer Harbor estuary provides a valuable transition zone for out-migrating juvenile salmon prior to heading out to sea. It's also an important forage fish feeding area for both juvenile and adult salmon. Deer Harbor is located in one of the four "critical forage fish and eelgrass habitat regions" identified in the recently completed SRFB San Juan County Forage Fish Spawning Habitat Assessment, February 2004.

We hope this project serves as an example of how to garner, support, and develop community solutions to a resource need, and will act as a stepping-stone to future near-shore marine and estuary habitat restorations and protections on Orcas Island, and throughout San Juan County.



The Deer Harbor estuary provides a valuable transition zone for outmigrating juvenile salmon prior to heading out to sea.

Deer Harbor is located in one of the four "critical forage fish and eelgrass habitat regions"

The Shared Strategy and Salmon Recovery—

A Local and Regional Partnership

By JAGODA PERICH-ANDERSON, ASSOCIATE DIRECTOR



The Shared Strategy is a groundbreaking collaborative initiative to protect and restore

salmon runs across Puget Sound. Shared Strategy engages local citizens, tribes, technical experts and policy makers to build a practical, cost-effective recovery plan for listed salmon species endorsed by the people living and working in the watersheds of Puget Sound.

Participants in the Shared Strategy include NOAA Fisheries, U.S. Fish and Wildlife Service, Puget Sound Tribes, state natural resources agencies, local governments, businesses and conservation groups.

The Shared Strategy is based on the conviction that people in Puget Sound have the creativity, knowledge, and motivation to find lasting solutions to complex ecological, economic, and cultural challenges. Shared Strategy supports watershed groups



that are working to develop a comprehensive strategy for salmon recovery—one that identifies what it will take to achieve healthy and viable salmon populations within the context of local community values and needs.

San Juan county and communities such as Deer Harbor are moving in the right direction to contribute to regional recovery. Early action projects such as those proposed under the 2496 Lead Entity process are an important contribution for salmon habitat while long-term plans are being developed. Protecting and restoring the nearshore-marine habitat around the islands will be an important element of the regional recovery plan.

In addition to San Juan, thirteen other watersheds plus a regional nearshore group are participating in the Shared

Strategy to identify actions to recover salmon and obtain commitments to achieve them. These individual watersheds are developing technical content and implementation structure for their local chapter. This fall and winter, local watersheds and regional scientists and policy experts will work together to craft agreements to meet regional recovery goals.

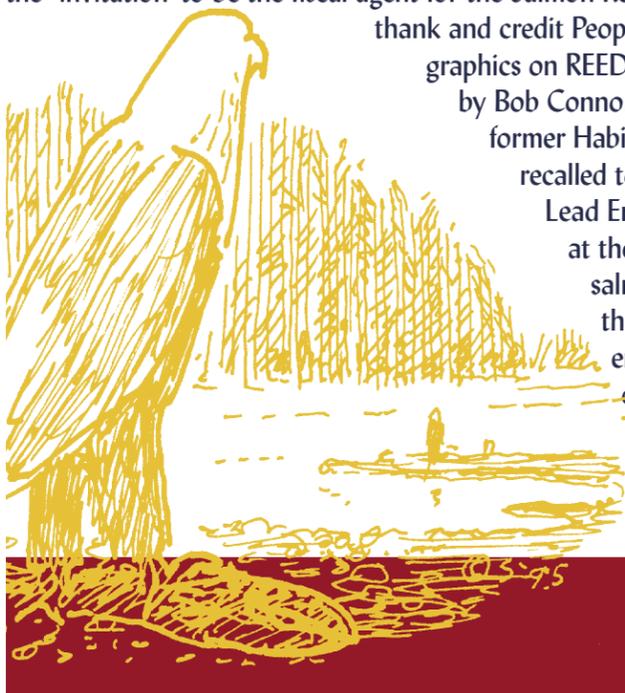
The final recovery plan for the Puget Sound region, to which the San Juan islands will contribute an important chapter, will reflect local needs and priorities while meeting Endangered Species Act requirements.

...communities such as Deer Harbor are moving in the right direction to contribute to regional recovery.

PEOPLE FOR PUGET SOUND AND REED

By MIKE SATO, DIRECTOR OF EDUCATION AND INVOLVEMENT

People For Puget Sound have been intrigued with the REED project from the very beginning. We are honored to have been able to support the efforts and drive of Isabelle Athmann and the REED scientific team in various ways throughout the past few years. It was with pleasure that we accepted the invitation to be the fiscal agent for the Salmon Recovery Funding Board grant. We would like to thank and credit People For Puget Sound Artist: Syd Stibbard for the graphics on REED's first newsletter. The Salmon picnic hosted by Bob Connor last fall was a pleasurable experience for our former Habitat Restoration Director Jacques White. He recalled to me just recently the thoughts of the SJC Lead Entity Coordinator, David Hoopes, who stated at the picnic, "This is how we are going to recover salmon." Most memorable for him though were the sweet songs and voice of Sharon Abreu, local environmental artist and educator. Her message is our message. "Calling the Salmon Home" is what the community of Deer Harbor is doing and we entrust and support your vision of a restored estuary and ecosystem.



The shared strategy is based on the conviction that people in puget sound have the creativity, knowledge, and motivation to find lasting solutions to complex ecological, economic, and cultural challenges.

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Restoring the Estuary



Ecosystem of Deer Harbor

Newsletter - Volume I

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The SeaDoc Society, a marine ecosystem health program, is extremely supportive of the Deer Harbor estuary restoration project. They have assembled an amazing team of scientists and concerned local citizens and are basing their decisions and actions on good science.



A Letter of Thanks

DEER HARBOR COMMUNITY:

By Ken Brown, Outreach Coordinator

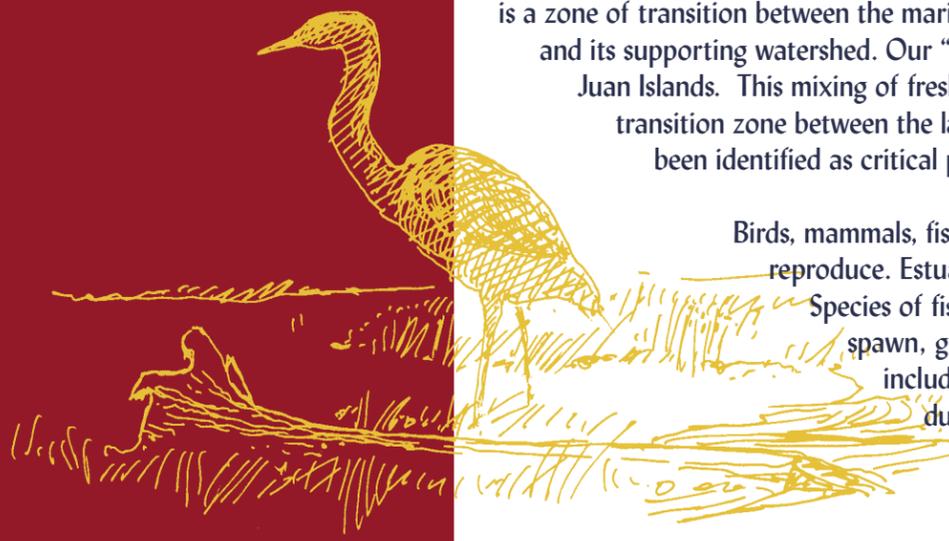
It has been my privilege to serve as Outreach and Field Coordinator for this amazing endeavor. My time in the field and time spent with Deer Harbor community members and Orcas students has been an honor. I would like to take this opportunity on behalf of the REED team to thank some people. First and foremost on behalf of the REED team and the community of Deer Harbor I want to thank Mike Sato and People For Puget Sound for all of their support on the estuaries behalf. Thank you Salmon Recovery Funding Board and our local Lead Entity for supporting our community project. The openness of property owners of the Deer Harbor Estuary and it's supporting watershed for their generosity in allowing the REED's scientific team to walk their land needs acclaims. Bob and Meg Connor vision, commitment and contribution to their land goes beyond measure and has over the years been truly inspirational to me. The Inn on Orcas Island welcomed us in with unlimited graciousness Jack and Jan Helsell have been most courteous to us all as we walk their land. The Deer Harbor Boat works has been most generous in sharing their land, resources and leadership. The list of generous and open property owners goes on. Bill Koch, Julie Remington, Charlie and Valerie Binford, Greg Vongehr, Doug and Ellen Allen, The Svaren Family, Harold Miller, David Adams, David Olsen, Carl Traecy, Tim Jolley, the Piaget Family, James Hehne, Tammy Martin, Dory Landsdowne, Patty and Raymond Brogi, and Gary Kratochvil. The Deer Harbor Marina has been very supportive throughout this entire project. They have been very generous with all that is theirs and we thank them for their bounteousness. The Deer Harbor Community Club's welcoming arms to Isabelle and myself and fellow colleagues has been beyond measure. Brandon Stollard of Sound Diving has always been here serving the Harbor in many ways and has been an example to follow. John and Marilyn Storey have been most generous with their land. Countless students and scientists have found a haven (and parking) in their yard. The Bullock's presence during field visits, field trips with students and sharing their vast knowledge base and resources has lead us. A special thanks for hydrologist and community leader Michael and his wife Trudy Stansbury, Emerald Isle Sailing Charters for the wonderful charter and support. Orcas Boat Rentals for all the support on the water. Roger Weinel, thank you for for the history of the area and for your support. Sincere appreciation to John Thompson for all the extensive historical information and for all the support. Thank you John and Yvonne Ashenhurst for all your support. Thank you to the Averna Family for their enthusiastic support. The Salmon picnic, last fall, generously hosted by Bob and Meg Connor could have not been the success it was without the help of Sam Bullock and his crew, Grange Master, Leslie Seaman and the enchanting music and lyrics of Sharon Abreu, accompanied by legendary Michael Hurwicz. Walter Henderson gifted us with his workshop and Paul Lindersmith crafted the reader board and donated his time and creativity, at the Deer Harbor Marina. Malcom and his tribe have blessed us. Janice and Anthony Richardson were most generous with their land and access to the estuary on fieldtrips, thank you thank you. Nancy Southerland for all the volunteering, early edits and wisdom. The Cookston Family for their support, information and help in the field. Gregory Books, Orcas High School's Environmental Science Teacher and his various students have been enthusiastically there, again and again, throughout these past few years. The student's help in the field have been the greatest of times. We couldn't have dragged the nets and counted all of those fish without them! Marta Branch, Orcas High School Biology Teacher, Moran's Environmental Learning Center Environmental Educator, her students and her husband, Phil Branch have spent equal amount of hours in the field with our scientists and our appreciation for their enthusiasm is also beyond measure. Thank you Zack Whitridge your contributions with the children in the field netting the salmon is greatly appreciated. The Salmonberry School's bright students time in the field was a delight for myself and our field experts. Thank you to Island's Stewards for their help with receiving a Norcross Grant for field equipment. No amount of superlatives could capture our appreciation and surprise at David Densmore's painting of the estuary gifted to the REED project this last winter. It is a symbol of vision and power to call our salmon home. I want to thank Bea Ranker for all of her encouragement and for walks and talks and beach clean ups. Lastly we dedicated this newsletter to Sandy and Tina Wylie Echeverria's three daughters for all the work they have done in the field and for their commitment to habitat and salmon recovery. Thank you Rebecca, Victoria and Tessa!

Deer Harbor has been identified as critical pocket estuary vitally important to the marine life that dwell in the San Juan Islands.

An estuary is "a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage." -- Pritchard (1967)

A broader definition of estuary is "a semi-enclosed coastal body of water which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from land drainage" (Pritchard, 1967). This definition includes the Deer Harbor Cayou Lagoon. The important characteristics of an estuary are that sea water mixes with fresh water, and that there is an influence of the ocean tide. Thus creating a dynamic relationship between the two water types. It is a zone of transition between the marine-dominated systems of the ocean and the upland river, or in our case a stream, and its supporting watershed. Our "pocket estuary" yields some of the most biologically productive life in the San Juan Islands. This mixing of fresh and salt water creates a unique environment that brims with life of all kinds - a transition zone between the land and sea. Estuaries are critical for the survival of many species. Deer Harbor has been identified as critical pocket estuary vitally important to the marine life that dwell in the San Juan Islands.

Birds, mammals, fish, and other wildlife depend on estuarine habitats as places to live, feed, and reproduce. Estuaries provide ideal spots for migratory birds to rest and refuel during their journeys. Species of fish and shellfish rely on the sheltered waters of estuaries as protected places to spawn, giving them the nickname "nurseries of the sea." Hundreds of marine organisms, including most commercially valuable fish species, depend on estuaries at some point during their development. Estuaries gathers and holds an abundance of life-giving nutrients from the land and from the ocean, forming an ecosystem that contains more life per square inch than the richest Midwest farmland.



A SCIENTIFIC FAMILY

BY SANDY WYLLIE ECHEVERRIA PH.D RESEARCH SCIENTIST



Figure 1. Tessa and Tina measuring fish collected with the 80 foot beach seine.



Figure 2. This photograph is an aerial view of the northern reach of Deer Harbor. Each quarter in 2003/04 the stations marked by red circles are occupied and submarine light is measured. The blue circles mark stations that are sampled more frequently.

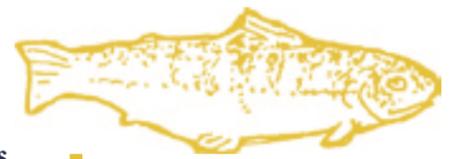


Figure 3. Rebecca, Victoria and Sandy sampling submarine light in the northern reach of Deer Harbor. The instrument Sandy is holding measures light at the surface of the water and through the water as it is lowered to the bottom. Although the sensor is not visible, Rebecca is measuring the temperature and salinity of surface and bottom water. Victoria records data from both sensors.

The Wyllie-Echeverria family samples near shore environments throughout the Northern Hemisphere where investigation of the seagrass biome and near shore fish assemblages has taken them to both sides of North America, Iceland and Western Europe. Their studies include taxonomic identification of species, ecological interactions between and amongst species, characterization of environmental parameters that influence species distribution and the connection between plant and animal species and the sustainability of human culture. Together they have presented the results of their research to international meetings, regional scientific societies and local coastal planners. While the family works as a unit, each member brings individual interest and expertise to the inquiry and it is this activity that is the cornerstone of their home schooling enterprise known as Glyptodon Day School.

The Wyllie-Echeverria family lives on Shaw Island and are members of the REED scientific team and as such are responsible for characterizing the nearshore fish assemblages of Deer Harbor and the Estuary (see Appendix A for a preliminary project report), describing the boundaries of the seagrass, *Zostera marina* (eelgrass) population within the Harbor and Estuary and characterizing the suitability of the submarine light environment for seagrass growth (See Figures 1 and 2 for more details). Submarine light data will be used to parameterize models designed to describe changes to circulation patterns within the Estuary and Deer Harbor following new bridge construction.

Tina Wyllie-Echeverria has a Ph.D. in Fisheries Oceanography and is a freelance oceanographer in the Puget Sound Region. She also holds a position as an Adjunct Associate Research Professor at Brigham Young University. Her major research interests include the life history parameters of juvenile fishes including rockfish, flatfish and salmonids and how juvenile fish interact with their aquatic environment. Tina has recently completed a review of the rockfishes of San Juan County available from the San Juan County Marine Resource Committee.



Members of the REED scientific team are responsible for characterizing the nearshore fish assemblages of Deer Harbor and the Estuary

Sandy Wyllie-Echeverria has a Ph.D. in Botany and is a Research Scientist at The Center for Urban Horticulture and School of Marine Affairs, University of Washington. In addition to his research activities Sandy mentors undergraduate and graduate students at UW and other universities. His major research focus involves the ecological and ethnobotanical study of the temperate seagrass biome in an effort to conserve and protect these vital estuarine and coastal species. He publishes in a wide array of scientific and popular venues and currently has a co-authored article in review with his eldest daughter, Victoria.

Victoria Wyllie-Echeverria is 18 years old. Her academic interests include botany, linguistics, music, and literature. Since 2001 she has investigated the use of native plants by the residents of Shaw Island in San Juan County and has been awarded the Paul Pavel Pal award for self determined 4-H projects for the past three years at the San Juan County Fair. She is currently serving internships with Drs. Eugene Kozloff and Claudia Miles at the Friday Harbor Laboratory, UW and was recently awarded a Kiwanis scholarship to support her future studies in botany.

Rebecca Wyllie-Echeverria is 16 years old. Her academic interests include creative writing, music, visual arts (photography) and history. She has won several awards in 4-H for color and black and white photography at the San Juan County Fair and the Western Washington State Fair and has published poetry in two nationally circulated documents – Poets against the War and The Celebration of Poetry. Rebecca also served as a State House of Representatives Page for Representative Jeff Morris and this summer was selected to participate in the poetry seminar of the Young Writers Studio at the University of Iowa.

Tessa Wyllie-Echeverria is 14 years old. Her academic interests include mathematics, creative writing, textile arts (weaving) and philosophy. She has won awards in 4-H at the San Juan County Fair and the Western Washington State Fair for weaving. Tessa's public demonstration for 4-H describing a procedure to sample the beach for eggs of two ecologically important intertidal spawners – Pacific Sand Lance and Surf Smelt- received an award at the San Juan County Fair. Her poems have also been published in the national publication The Celebration of Poetry.



What Salmon need in Deer Harbor to complete their life cycle...

WATER

Clear, cold, clean and consistent water

GRAVEL

For laying their eggs. A REDD is the gravel nest for salmon eggs.

EGGS

If salmon have healthy habitat and can get away from predators, they will live to return to their native stream and lay their own eggs...And the cycle of life starts all over again!

WETLANDS

Wet land are important for regulating water flow and filtering runoff. They help to keep streams clean for salmon.

PLANTS

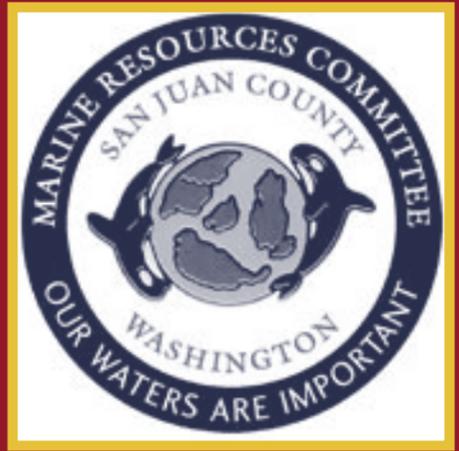
The riparian vegetation along a stream, wetlands and the nearshore help shade the water to keep it cool and their roots and branches make great hiding places for fish. Riparian plants in the nearshore marine environment include eelgrass and kelp. Eelgrass is important habitat for migrating juvenile salmon and for hosting the forage fish that salmon rely on.

ESTUARIES

Those pockets of convergence are the nursery grounds for the salmon cycle and the young and old marine creatures that support them. Juvenile salmon use estuaries, even the Deer Harbor one for shelter and to grow up in and when returning to spawn use the estuary to help them adapt to fresh water again.

FOOD

In the estuary and the nearshore salmon eat foods that give their flesh the pink color we love to eat. The important forage fish in Deer Harbor are herring, surf smelt, sand lance, juvenile shiner perch, and crustaceans.



Eelgrass: A Marine Meadow

By SANDY WYLLIE ECHEVERRIA PH. D.

RESEARCH SCIENTIST

Carried on the ocean currents in late summer or early fall the small seeds (about half the size of a single grain of short grain brown rice) of the seagrass, *Zostera marina* L. (eelgrass) arrive on the surface of the sediment. Over the next few months seeds are worked into the sediment matrix. Peak germination occurs in late winter and as the water warms, seedlings grow. Those that survive the critical stage of adjustment from seed to leaf green shoot continue to expand as rhizomes creep through the sediment assisted by the initiation of new daughter shoots that pierce the sediment to capture sunlight and fuel new growth. In this meadow forming process, *Z. marina* can cover many acres of submerged land creating underwater prairies that stabilize the bottom, retard currents, recycle nutrients and create habitat for other species. The diversity of habitat niches within the canopy of the swaying green leaves or the caramel colored rhizomes is truly amazing as all surfaces, edges, lateral leaf blades, rhizomal curves, are food, foraging grounds or nursery sites for animals that crawl, swim and fly. In the Puget Sound, this rich diversity also includes juvenile salmon and the prey of adult salmon. In more quantitative terms, the ecological services provided by an acre of *Z. marina* are valued at \$25,000 (2004 dollars).



ORCAS STUDENTS NETTING SALMON

Photo graphs by Phil Branch



THE SEARCH FOR SALMON

DR. TINA WYLLIE-ECHEVERRIA, FISHERIES OCEANOGRAPHER

Do juvenile salmon occupy Deer Harbor and Cayou Estuary? That was the question posed by the habitat assessment team. To answer that question a variety of "fish traps" or nets were used in October, March and June to determine which fish were present.



Our results are a positive indication of habitat use by salmonids.

The October sampling was aided by Marta Branch's Marine Biology class. Students and scientist worked together to set a Fyke net in the estuary and deploy a 37 meter beach seine along the eastern shore of Deer Harbor. Resident species such as staghorn sculpins, pipefish, and gunnels were found. Returning in March 2004 we were joined by Greg Book's Environmental Studies class. We found a few juvenile salmon, chums and pinks, in the estuary and in Deer Harbor. These fish were around 1.5 inches long, about the size they would be when they left their natal stream and entered the Sound. Our final sampling, just completed in June caught three chinook juveniles in the Deer Harbor area. Other fish caught with these nets included starry flounder, English sole, snake prickles, shiner surf perch, juvenile hexagrammids, surf smelt, sticklebacks, and juvenile herring. So, the answer to our question is YES! juvenile salmonids are found in Deer Harbor and in the Estuary during spring and summer months. Our results are a positive indication of habitat use by salmonids. More frequent sampling planned for next year will help us evaluate how long these species of salmon frequent Deer Harbor and its estuary.



YES! juvenile salmonids are found in Deer Harbor and in the Estuary

STREAMS, SALMON AND EMPOWERING COMMUNITIES THROUGH RESTORATION ACTIVITIES

By MARY LOU WHITE, WASHINGTON TROUT

A watershed ecosystem (even a small one like Deer Harbor) is incredibly complex, all physical and biological elements interconnected. The system cannot function properly without all elements present and healthy. Washington Trout's mission is to use the best available science to identify problems that limit ecosystem function, and to design restoration models. Washington Trout represents no specific user groups, but is dedicated solely to the needs of Washington's wild fish. Washington Trout provides a vehicle for communities that want to get meaningfully involved in native fish recovery. Washington Trout is a non-profit conservation organization established in 1989 to protect and restore Washington's wild fish and their habitats. Washington Trout seeks to improve conditions for all of Washington's native fish by conducting important research on wild-fish populations and habitats, advocating for better land-use, salmon-harvest, and hatchery management, and developing model habitat-restoration projects.

SIMILAR WATERSHEDS AND FINDING SALMON

In the summer of 2000, Washington Trout (WT) surveyed 74 streams on Vashon Island, upgrading 37 stream reaches from non-fish-bearing to fish-bearing. Vashon Island like the San Juan's are drained by typically small, low gradient streams that provide habitat for coho and other salmon species, and sea-run cutthroat trout. Most Vashon Island streams were originally classified by the state as non fish-bearing, only a handful classified as fish-bearing, and many unclassified or not identified on maps at all. The upgraded stream reaches, representing miles of new fish habitat were explored by our team of habitat specialist. WT then created an interactive internet-based GIS map-set to disseminate the fish-distribution data and other information (available on the WT web site at www.washingtontrout.org/maps). Similar projects were completed in Port Ludlow (2001) and are now being completed for Orcas Island (2004). Foresight and commitment of island communities directly benefit native fish. An accurate inventory of fish-bearing streams will help planning entities evaluate the health of local streams, identify habitat needs, and prioritize restoration efforts.

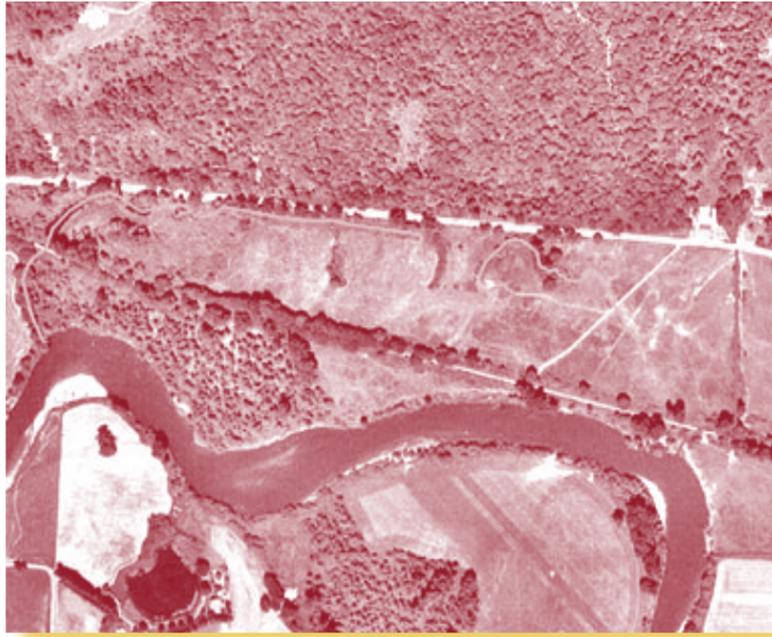


Foresight and commitment of island communities directly benefit native fish.

A RESTORATION EXAMPLE: WEISS CREEK

The Snoqualmie River Basin is one of the most productive salmonid systems in Puget Sound. Small tributaries like Weiss Creek, a tributary to the Snoqualmie, offer spawning habitat for some species, but more importantly, rearing habitat for juvenile salmon and trout that were spawned in Weiss Creek and other parts of the system. The young salmonids, some spending up to two years in fresh water before migrating to sea, often move into smaller creeks to escape harsh conditions in the main river, including high winter flows and high summer temperatures. Small off-channel creeks like Weiss offer better and easier feeding opportunities for young salmon and trout, and refuge from predation by larger fish. The loss of off-channel rearing habitat has been identified as a critical limiting factor for salmon in the Snoqualmie Basin.

The Weiss Creek Restoration Project was designed by Washington Trout and a private landowner to restore salmon and trout rearing habitat by recreating the full range of natural stream functions in lower Weiss Creek. The stream had been straightened and diked



Weiss Creek Restoration Site

in the 1920s to create a pasture on the floodplain. The diked channel was only about 800 feet long, providing a very limited range of stream function and available rearing habitat, significantly reducing the productive capacity of Weiss Creek. The primary phases of the project involved re-excavating the historical channel, adding large woody debris, and connecting the restored channel to some associated wetlands and beaver ponds. The completed project has re-routed the creek from the 800 foot diked ditch back into its historical channel, recovering over 5000 feet of flood plain channel and about 20 acres of wetland, rearing habitat for juvenile coho salmon, winter steelhead and cutthroat trout. The landowner, Andy Weiss, demonstrated an incredible commitment to the project and wild fish recovery. He originally proposed the restoration venture to WT and gave up a significant amount of real estate to the project, and contributed labor, time, and equipment to the effort.

WT crews replanted the riparian zone around the restored creek with over 12,000 native trees, shrubs, wetland plants, and grasses, and installed stock fencing to protect the channel from cattle and horse grazing. The new vegetation will provide shade and cover for fish, help moderate water temperature, filter sediments, contribute organic matter to the water, and provide habitat for insects, birds, and other animals. Ultimately, the trees will become a source of in-stream large woody debris (LWD), an important fish habitat.

An Irony of the completed project is that it looks less impressive than it actually is. The restored channel appears so natural and complete that at first glance, the project may look like the simple fencing and replanting of the riparian zone around a functioning stream. But



REED will use the results of Washington Trout's watershed assessments to share with the community the most ecologically and economically appropriate salmon restoration projects.

the project represents cutting edge restoration-ecology, the full recreation of a stream, almost from scratch. Project designers studied historical resources and carefully surveyed the immediate topography to determine the channel's course, elevation, and gradient. Portions of the channel had to be completely re-excavated from the pasture – with close attention paid to elevation and gradient controls – and the LWD elements were carefully placed using heavy equipment. Some portions of the channel were allowed to dig themselves once water began flowing through the stream. Important hydrological functions like sediment sorting, bank cutting, and pool forming were also largely left to the stream itself. The important goal of the project was not just to create artificial habitats, but to restore habitat processes to Lower Weiss Creek, to give it the opportunity to work and evolve like a natural system. The approach and techniques WT used at Weiss Creek are proving themselves: the restored stream is responding to natural events, and juvenile salmon and trout are now utilizing the recovered habitats.

FISH TRAP CREEK: A RESTORATION OPPORTUNITY

In March of 2004, Washington Trout accepted enthusiastically to be part of the REED scientific team. Our part of the Deer Harbor story is to conduct a qualitative habitat reconnaissance and



Weiss Creek two years after restoration work was completed

culvert assessment on Fish Trap Creek, a small stream that drains a 736-acre watershed on the west side of Orcas Island into Deer Harbor. Existing stream conditions, fish habitat, barriers to fish passage, and salmonid spawning and rearing potential are of particular interest, since this information will help inform future restoration recommendations for Fish Trap Creek, and will also aid in developing design plans for the Deer Harbor Bridge project. REED will use the results of Washington Trout's watershed assessments to share with the community the most ecologically and economically appropriate salmon restoration projects.

At first glance, Fish Trap Creek's potential to bear fish is easily overlooked. No fish were in fact observed in Fish Trap Creek by Washington Trout Crews in 2004. However, it is currently classified by the Washington State Department of Natural Resources as a fish-bearing stream on the basis on physical characteristics such as stream width and gradient.

Fish Trap Creek has a number of important attributes of a stream that is still capable of supporting fish.

Unusual in the San Juan archipelago, such estuarine environments are of critical importance during the life history of Pacific salmon.

Fish Trap Creek is a potentially important watershed for salmonid use in the San Juan Islands.

At first glance, Fish Trap Creek's potential to bear fish is easily overlooked. No fish were in fact observed in Fish Trap Creek by Washington Trout Crews in 2004. However, it is currently classified by the Washington State Department of Natural Resources as a fish-bearing stream on the basis on physical characteristics such as stream width and gradient.

Because of its agricultural history and modifications to its hydrology, Fish Trap Creek is lacking in flow and in-stream LWD, and is therefore deficient in both deep water and riffle/pool complexes which together form favorable fish habitat. Fine sediment also covers the stream bottom which limits access to spawning gravel. Nevertheless, Fish Trap Creek has a number of important attributes of a stream that is still capable of supporting fish: (1) isolated patches of spawnable gravel; (2) mid-channel and headwater ponds which could provide rearing habitat upon the removal of man-made barriers; 3) wetlands which aid in ground water recharge, improve ecological diversity, protect water quality, and provide flood control; 4) stretches of intact riparian corridor; and 5) a well-defined estuary at its mouth. Unusual in the San Juan archipelago, such estuarine environments are of critical importance during the life history of Pacific salmon.

Fish Trap Creek is a potentially important watershed for salmonid use in the San Juan Islands. Many of its current deficiencies can be corrected. Flows can be enhanced by redirecting the stream channel through sediment depositional areas and by improving connections. High water temperatures can be reduced by planting riparian corridors and pond banks. Large woody debris can be added to the stream and fish-passage barriers can be removed. As in the early stages of the Weiss Creek restoration project, improving habitat in Fish Trap Creek may appear a daunting task. Fortunately, where communities are willing to restore natural areas miracles happen. Support, patience, and a positive vision go a long way in restoring the function of any watershed.



Looking upstream at typical channel habitat on Fishtrap Creek

...where communities are willing to restore natural areas miracles happen.

READING THE FOREST BY THE TREES

By BRENDA BECKWITH, PHD CANDIDATE, UNIVERSITY OF VICTORIA
DEDICATED TO DR. WAYNE SUTTLES

Plants are clues to the past. They can provide insight into the composition of former landscapes and also tell us how a landscape has changed. Most importantly, plants reveal much about human interaction within a landscape. Was it farmed? Was it burned, drained, or ploughed? Or left alone to run its natural course?

Over ten years ago I began my journey to become an ethnobotanist; that is, one who studies the relationships between people and the plant world. Usually this discipline focuses on indigenous peoples, but it can also revolve around the people-plant connections of early colonists, settlers, and old-timers. That is, anyone who may have local and intimate botanical knowledge that comes from dwelling in one place for a long time. Plants are clues to past landscapes, and those landscapes include humans in intricate and intimate ways.

Now I have become a landscape investigator of sorts: an ethnoecologist. I want to know not only how people interacted with the flora, but how they made a livelihood within a landscape. How did they manage culturally important plant species? How did the resultant changes in the productivity and availability of these resources affect peoples' economic choices and social mechanisms? How did people and plants co-exist?

Plants are also clues to the future. Because landscape change is cumulative, plants can suggest an ecological trajectory of a specific landscape (e.g., grassland to woodland or savanna to forest). The restoration of present-day landscapes depends on our ability to reconstruct the environmental and social history of those landscapes. However, finding botanical clues to describe the past environment is challenging when landscapes have been highly altered or degraded. Often landscape characteristics, such as the number and type of exotic plant species, can depict much about land use patterns in the last 100 years, but provide little botanical information regarding earlier times. Those who have gotten to know me know that I can spend hours looking at and for plants. They also know how excited I can become when I see a native plant that is now considered to be uncommon, but has a particular significance to the local indigenous peoples. An excellent example from this region is the wild crabapple (*Pyrus fusca*). Old groves of these gnarled trees, which appear like something created in the imagination of Tolkien, tend to be difficult to find these days. The fruits were revered by many coastal indigenous peoples and the hard wood was used to make bows, wedges, digging sticks, and halibut hooks, among other implements and tools. The bark was used to treat a variety of ailments.

The restoration of present-day landscapes depends on our ability to reconstruct the environmental and social history of a landscape.



My role in REED includes surveying the plant communities of Cayou Lagoon, Fish Trap Creek, and the numerous ponds and terrestrial ecosystems associated with the watershed. A major element of this work are the on-going discussions and consultations with local landowners and other community members.

To date, over 200 plant species have been recorded growing in the watershed. The percent of exotic species range from 12% - 43%, depending on the specific site. Various environmental factors and site histories have resulted in the current botanical assemblages found across the landscape. For example, the highest number of exotic species occurs in the low meadows below Cormorant Bay Road, an area well associated with years of farming and soil disturbance.

Alternatively, the fewest "introduced" plant species occur around the natural wetlands in more remote areas of the watershed.

This year a friend and colleague, Fran Spencer, has joined me in my work on this project. We will provide information useful to the Deer Harbor community, such as a homeowners planting guide for ponds and stream-sides. With the assistance of Isabelle Athmann and Ken Brown, we have made valuable connections with the community and property owners. For example, we have met with Bob Conner and Sam Bullock to discuss how to collect, propagate, and reintroduce native plants from local sources. Having a project that integrates local knowledge and, as much as possible, local plants, are key components to the maintenance of both ecological and cultural integrity.

Community participation and engagement are at the core of successful restoration projects.

Landscape restoration is as much about restoring respectful and healthy human relationships with the natural world as it is about restoring ecological structure and function. Often, the relationships between people and plants are reciprocal. Many native plants need to be disturbed every once in a while: a bit of a kick-start to maintain their productivity over time. This disturbance can come in the form of mild soil tillage, pruning, burning, and selective harvesting: all traditional management techniques used by the Straits Salish peoples in this region. The result of the reintroduction of stewardship practices will be an ethnobotanical landscape with plants that can be used for food and medicine, in crafting, technology, and weaving. Moreover, some native plants have fragrant and showy flowers or colorful and aromatic foliage. These plants are beneficial to humans, birds, fish, and insects alike.

Community participation and engagement are at the core of successful restoration projects. Through mindful tending, careful observation, and continued interaction, plant communities and human communities can thrive.

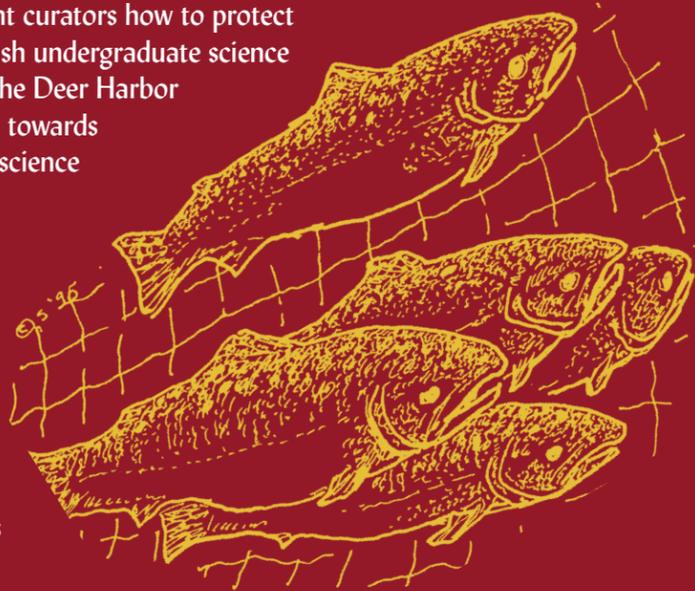
PORTRAIT OF THE DEER HARBOR ECOLOGY YET TO BE DISCOVERED

By RUSSEL BARSH, DIRECTOR CENTER FOR THE STUDY OF COAST SALISH ENVIRONMENTS

An understanding of the historical ecology of Deer Harbor has come to us in the form of lost papers and field specimens in the recesses of the Smithsonian Museum in Washington DC, locked away for centuries. Field notes from a naturalist, Dr. C.B. R. Kennerly, on a secret mission of the 7th President of the United States, Andrew Jackson, to document and record the ecological integrity of these islands. Sent on a tasking and harrowing journey that he failed to return home from Dr. Kennerly joined the International Boundary Commission's 1860's survey of the San Juan Archipelago, a survey commissioned to determine our borders. Dr. Kennerly's papers more than anything have opened the tidesgates for salmon recovery in the San Juan Islands. I start this article with a description of his first visit to Deer Harbor in dedication to his work all those years ago and to Dr. Wayne Suttles, our local ethnohistorian and colleague who more than anyone understands his notes.

"Although this bay is a prominent feature it has no existence on the chart of the U.S. Survey and the inhabitants in the absence of any other named called it "Fish Trap", because at the mouth of the stream emptying into it there is an old weir in which the natives have been in the habit of taking salmon." {Kennerly 1860}

On to paleoecology! Our Samish Research Center; The Center for the Study of Coast Salish Environments was created in 2002 to provide scientific support for sound stewardship, research and conservation projects of the Samish Historic Territory and to prepare Samish young tribal members for careers in the sciences and engineering. Funding for the Center come from competitive sources such as the National Science Foundation, as well as research contracts with State and Federal agencies that share management responsibilities in the "Salish Sea". We are honored to have our students studying in Deer Harbor. Initially, their focus is "paleoecology" - that is, learning about the history of changes in the environment, including the ways in which Samish people shaped, and were shaped by the ecosystems in which they lived, fished, and hunted. Paleoecology shows that our ancestors were masters at adapting to, and sustainably managing a complex and ever-changing marine environment for thousands of years. Precise knowledge of how our ancestors took care of particular islands, bays, beaches, fish, and shellfish will give us guidance for the future protection and enjoyment of the resources that form our biological legacy. Paleoecology involves the study of natural sediment deposits in estuaries and bays, as well as "cultural deposits"- vast shell middens that remain from our ancestors' homes throughout the islands, and form a record of what they harvested, ate, manufactured and traded. As part of the Salmon Recovery Funding Board Grant and from other funding sources the Center will not only survey and study Samish archaeological and cultural sites in Deer Harbor, but help to teach their current curators how to protect them. The Center's first team of Samish undergraduate science students are working year-round on the Deer Harbor research project as part of their work towards degrees. Doctoral and post-doctoral science students as researchers and mentors for our young Samish scientists are also enjoying time in the field in Deer Harbor. We are continuing building partnerships and laboratory-sharing arrangements with major Northwest universities and government research laboratories for the field samples the property owners of the Deer Harbor are generously allowing us to borrow.



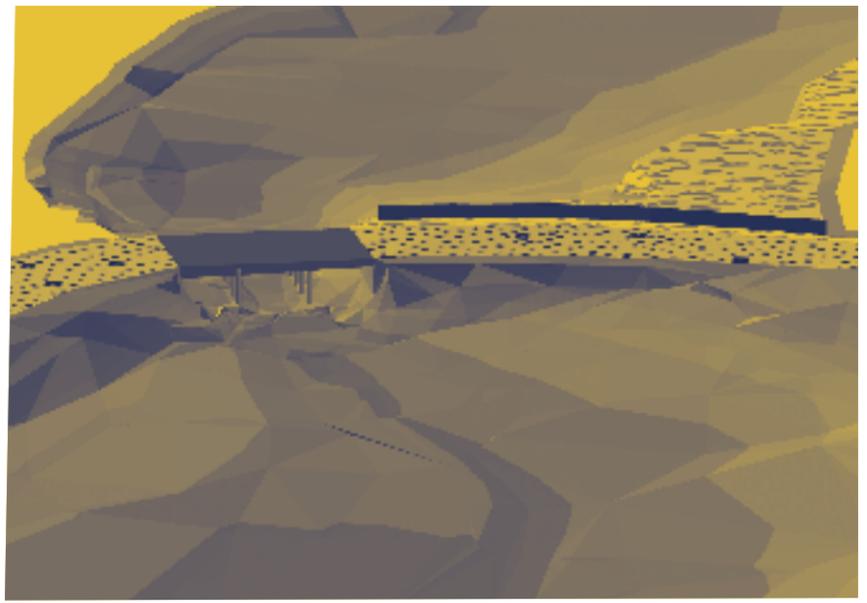
A CREATIVE OPPORTUNITY

By TOM MAUL, ARCHITECT

Hutchison & Maul is a two person architectural partnership in Seattle owned and operated by Robert Hutchison and Tom Maul. Our work varies in scale, clientele and project type, including residential, retail, and commercial projects. We like to design. We like to explore and develop unique ideas. We look to particular conditions of sites to generate these ideas. At the heart of every project, is a commitment to the public and making a positive contribution to our shared built environment. Working on the Deer Harbor Restoration Project is a good fit.

The community's vision of a restored estuary, new bridge and unique, multi-use, public/private educational and recreational development around Deer Harbor is very attractive to our firm. In the winter of 2003, Robert lead an architectural design studio, comprised of 12 students at the University of Washington that further explored these ideas. The result was 12 schemes that allowed us to see programmatic alternatives and different site responses for the community of life around Deer Harbor. We know the site better through this experience and we have a sense of what is viable and realistic.

Since this exploration of creative possibilities, we were most recently brought on as part of the project team to design – happily – just a bridge. Our first task in this process is to listen to the team of researchers and respond with appropriate conceptual architectural recommendations consistent with the restoration objectives. Our second task is to share the conceptual design recommendations with the community. This will happen some time in the winter of this year. As part of this concept we will host a “bridge design contest”! Look forward to hearing more of the details regarding the contest. A great way for the community to contribute to the project's direction. Based upon community input, and input from other stakeholders, a conceptual design will be selected for further development. Our final task will be to develop the chosen design so that it is consistent with code requirements and to share this development with the community along the way. We are excited to be part of this important project and look forward to meeting the community in and around Deer Harbor.



The community's vision of a restored estuary, new bridge and unique, multi-use, public/private educational and recreational development around Deer Harbor is very attractive to our firm.

AN ESTUARY, A BRIDGE, A SALMON STREAM, A DREAM AND WHAT DO WE DARE TO DO

By ISABELLE ATHMANN

DEDICATED TO THE MEMORY OF PHIL CHAMBERLAIN

From my experience and from the experience of countless of groups and communities like REED across this nation and the world the actual restoring of a place is one of the easiest things to do. Moving dirt around, letting water flow is minor. With regards to the REED project the Deer Harbor Comprehensive Plan was the hardest part. The Plan created the vision. REED merely had the fortune and honor of sharing the Deer Harbor Comprehensive Plan, this community vision, to the world. We shared this vision to the scientists, the habitat experts, the biologists, and the restoration experts that know how to integrate people and places. This REED team is the “best of the best”. They have paved the way through their collective efforts to welcome very cooperative government agencies into the loop. The agencies for this vision on a federal, state and local level, are lining up to lend us a hand. All we have to do is let them in. This joint venture in turn with the help of the Deer Harbor community will put the “pieces of the puzzle” back together. Not to worry Deer Harbor will be a place where people and marine species, including the magnificent salmon can live in harmony. Nothing displaced. A thriving economy and a thriving ecology can and do go hand in hand and we have the opportunity in Deer Harbor to be a model of this new integration. Let us be proud of the work we have all done and look forward to the day when we stand on the bridge and see salmon returning to spawn. Salmon seen from a bridge we designed for them.

A Leap for Salmon... How can you help?

There is the familiar phrase for taking care of the neighborhood you live in “Think Globally, Act Locally” that is easily applied here. We o Orcas are familiar with this concept in all that we do. Yet here is an opportunity to embrace “Returning the Salmon Home” to our style of “Island” living. Restoring the Estuary and Ecosystem of Deer Harbor is a worthy and easily accomplished project that can be manifested through our efforts and ours alone. Our team is and has been conscientious in the researching and the writing of grants for every funding opportunity out there. However these are all highly competitive and funding dollars are limited. Everyone on the REED team has contributed and donated countless hours to laying a strong foundation for this project success. Property owners within the estuary and the Deer Harbor watershed have contributed generously through hearing the vision and responding enthusiastically.

Permitting agencies believe in the success of this vision. Salmon can return to this small and precious system and can do so sooner than later with the right resources. If you want to help in the field we will provide as much fun and rewarding opportunities as possible in the years to come as the project moves into restoration phases. Here's the pitch: Financial support will speed up the process. It can take years and years or the return of salmon to Deer Harbor can be accomplished in a short amount of time.

The restoration is the easiest part. It is now up to you.

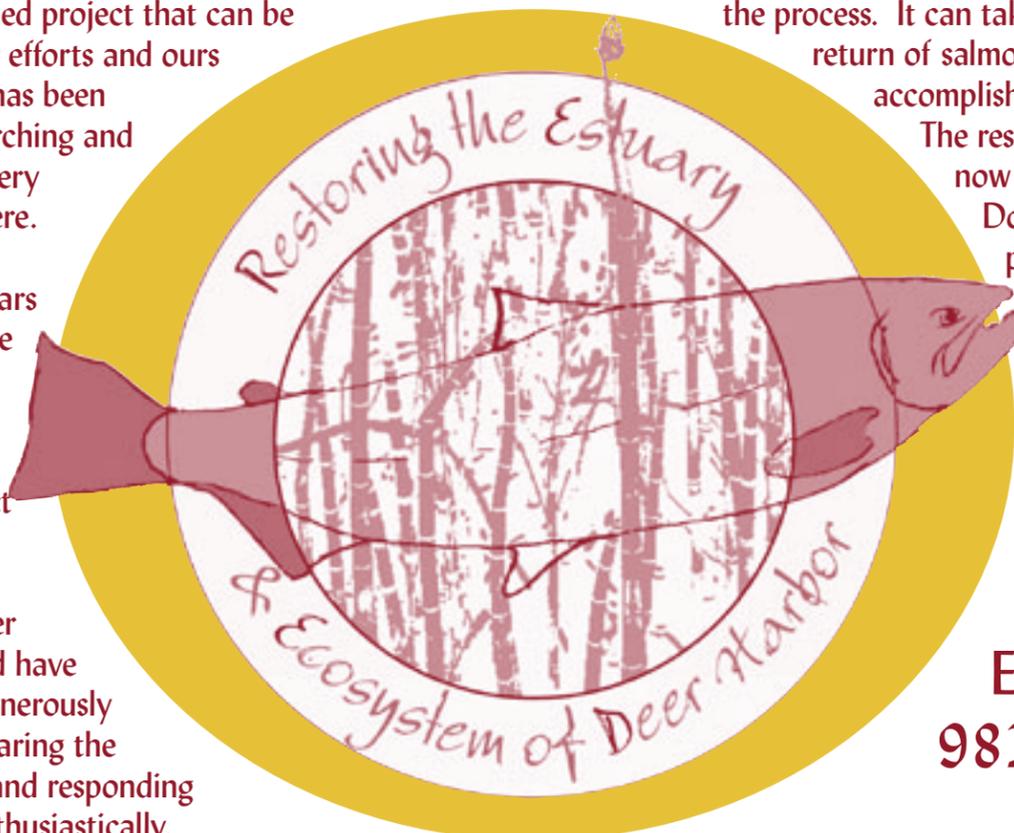
Donations for the Deer Harbor project can be made to SALMON AFFECT a local non-profit being set up to support this project. Call Leslie Seaman, SALMON AFFECT's Executive Director for details.

360-376-5080

PO Box 2022

Eastsound

98245



THE QUEST FOR A NEW BRIDGE

By TOM SMAYDA, CIVIL ENGINEER

As you all know, Deer Harbor's wooden bridge will not last forever, and plans for its replacement are afoot. At this early stage in the planning process, a team of scientists and engineers are taking advantage of Federal/State funding to study the area's ecosystem and identify a good course of action. Considerable information about mud, water, eelgrass, fishes, vegetation, ethno botany, and the like are being compiled. Later this year, the project team will determine the span and elevation of the new bridge, and will select its style.

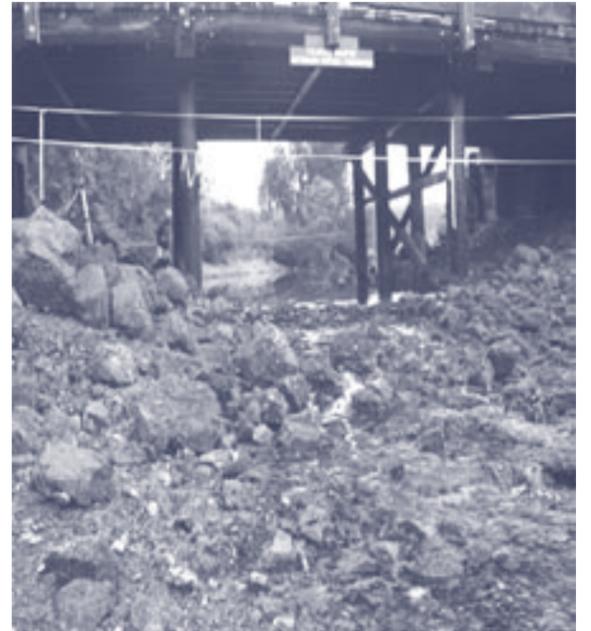
Cayou Lagoon, a tidal mud flat at the head of Deer Harbor is an important "pocket estuary". It is partially enclosed, with a narrow opening to Deer Harbor at one end and its small tributary, Fish Trap Creek, at the other. The existing bridge spans the lagoon at its narrowest place, but is undersized, limiting tidal exchange in and out of the lagoon. As you might have noticed over the years sediment is accumulating in the estuary. Our task is to design a replacement bridge that will restore circulation to natural levels.

The Existing Cayou Estuary Bridge

The existing timber bridge has timber footers and rock fill on the beach and in the intertidal range. A rock dam constructed beneath the bridge prevents water from fully draining out of the lagoon. This photo, looking northward into Cayou Estuary, shows the rock dam under the existing bridge and the ponded water in the estuary. This ponding is not a natural condition, causing sediment to accumulate within the estuary and preventing the formation of tidal channels. Considerable beach fill is associated with the bridge approaches and footings. A



portion of the beach fill is visible in this picture. The bridge approaches extend out about 80 feet onto the beach from one side and about 20 feet on the other, filling a portion of the intertidal zone with angular quarry rock



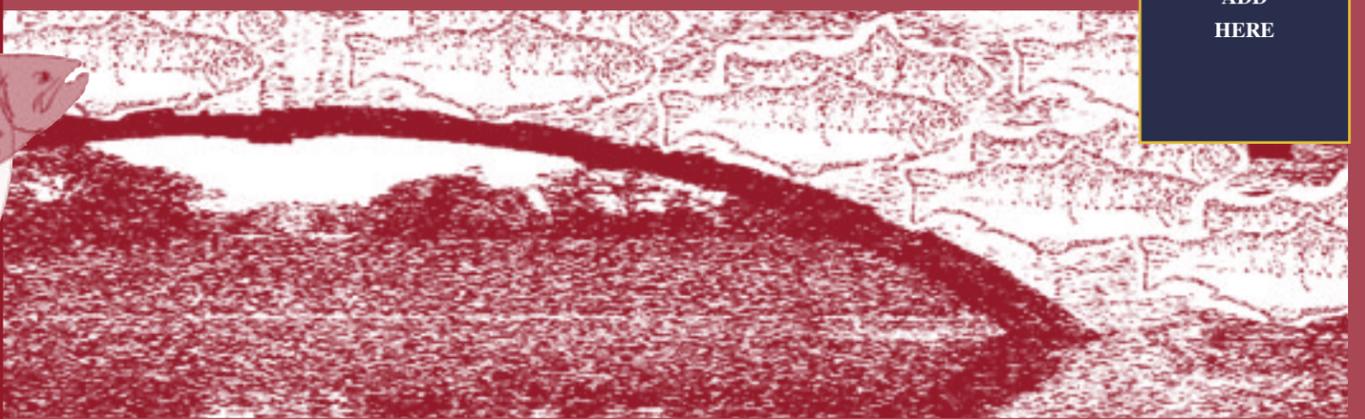
Thanks to local help, Mike Stansbury, Deer Harbor resident and hydrologist, installed two water level recorders, one in Deer Harbor and one inside the lagoon to monitor this exchange

Thanks to Local help, Mike Stansbury, Deer Harbor resident and hydrologist, installed two water level recorders; one in Deer Harbor and one inside the lagoon to monitor this exchange and below are his recordings. He states: "As you can see, the plots appear to track very closely until the harbor level drops below the estuary level. Once the water level drops below about 5.0 feet, water levels in the estuary are controlled by the rock weir under the bridge."

We are continuing to study the area so that we can accurately predict the changes that will occur following bridge replacement, and so we can specify the design features that are necessary. Our findings are still preliminary, so stay tuned. We are looking forward to working with nature and the Deer Harbor community.

SALMON AFFECT PO Box 2022 Eastsound, WA 98245

ADD
HERE



Restoring the Estuary & Ecosystem of Deer Harbor

a bridge for salmon

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