



**Meeting Minutes**  
**Nisqually River Council Meeting**  
**September 15, 2017**  
**BFJNNWR**  
Information: 360.438.8715

Attendees:

**Council Members**

**Jeff Barney** – Pierce County  
**Amy Cruver** – Pierce County  
**Matt Curtis** – DFW

**Amber Martens** – JBLM  
**Glynnis Nakai** – BFJNNWR  
**David Troutt** – Nisqually Indian Tribe

**Citizens Advisory Committee Members**

**Howard Glastetter** – CAC  
**Fred Michelson** - CAC

**Marjorie Smith** – CAC  
**Robert Smith** – CAC

**Guests**

**Roger Andrascik** – Nisq. Stream Stewards/Land Trust  
**Joe Kane** – Nisqually Land Trust  
**Curtis McFeron** – NOAA Marine Fishery Service  
**Etusko Reistroffer** – Nisq. Stream Stewards/Land Trust  
**Jim Reistroffer** – Nisq. Stream Stewards

**Martin McCallum** – NIT Board Member  
**Ashley Von Essen** – Nisqually Indian Tribe  
**Amy Wilson** – Mount Rainier Institute  
**Ben Dennis**  
**Warren Bergh** – Nisq. Stream Stewards

**Staff & Associated Nonprofits**

**Brandon Bywater** – Nisqually River Foundation  
**Justin Hall** – Nisqually River Foundation

**Emily McCartan** – Nisqually River Council

**1. Call to Order, Approval of Minutes and Agenda, Introductions**

**Call to Order** – David called the meeting to order at 9:12 am.

**Approval of Meeting Minutes and Agenda** – There was a motion to approve the day’s agenda and the minutes from the August meeting. Per Justin, Tara Chestnut’s portion is not complete because she wants to check it. Minutes were circulated.

**2. Reports**

**Advisory Committee Reports**

- *Citizens Advisory Committee* – The CAC’s only scheduled meeting this month was in conjunction with last week’s Nisqually Stream Stewards class. Karelina presented to the Stream Stewards on Wednesday to encourage some of the new Stream Stewards to join the CAC.
- *Chair Report* – David reported that he did not have a lot of specific chair-related work to report. He was interviewed about salmon recovery and the work going on in the watershed by KNKX for their Salish Sea series, which aired this week.
- *Staff Report*– Emily introduced herself as the new NRC Program Coordinator.

**Allied Programs**

- *Nisqually Land Trust* – The Hon. Joe Kane reported that the Land Trust has brought on two new staff members: Henry Smith as administrative assistant, and Addie Schlussel with AmeriCorps. The Land Trust’s Annual Meeting and salmon bake take place this Sunday. Registration is full and rain is in the forecast. The Trust is working on transactions all over the watershed, with nine in negotiation now from marine waters to Mt. Rainier Gate. David asked for an update on the Community Forest project. Joe reported that the Trust purchased its first 640-acre community forest property last year, and has made an offer on next 640-acre plot with an opportunity coming up to purchase another. They are discussing whether to go into debt financing to purchase, and exploring new financial options as more properties are

expected to come on the market soon. They are also in the process of setting up advisory committee of citizens for the Nisqually Community Forest and are looking for interested people. David asked to add the Community Forest as an Allied Program for future agendas.

- *Nisqually River Education Project* – Sheila Wilson is flying back from Boston, where she has been attending the NOAA Environmental Literacy Education Grantee Workshop. Brandon Bywater, NRF's AmeriCorps volunteer, reported that she is learning a lot and having fun and provided updates on the NREP programs. Training for Water Quality Training for volunteers and teachers is on 9/23 from 9:00-2:00pm at Tumwater Falls Park. There are 41-48 teachers interested in participating this year, and NREP still needs additional volunteers to help. Water Quality Monitoring Day through the watershed is Thursday, October 19. Next week, Nisqually Nearshore field trips begin with four days in September and four days in early October. We expect to see about 500 students (all of Nisqually Middle School's 7<sup>th</sup> and 8<sup>th</sup> grade). The Nearshore program is run in partnership with the National Fish & Oyster Company, Nisqually Reach Nature Center, and Pacific Shellfish Institute. The two main Tree Planting/Riparian Habitat Restoration projects are scheduled for late October or early November, but are currently on hold because to Mashel engineered log jams due to construction.
- *Nisqually River Foundation* – Justin reported that the Nisqually Indian Tribe has funded him and a few others to do some surveys around new Community Forest property. They walked from the confluence of the Busy Wild to the point where it changed from fish presence to non-fish presence, conducting habitat surveys. They found the area in better condition than Justin was expecting, with 14-15 inch trees and good canopy cover, and fish much higher in the creek than they had anticipated. Fred asked about drought impact. Justin said it was flowing throughout. Justin, Brandon, Emily, and Walker also floated the river yesterday surveying for fish. David and Justin had lunch with Bill Bryant, who is an NRF board member. He affirmed his interest in continuing to help out, especially with fundraising and garnering support from local businesses. The Nisqually Stream Stewards class is ongoing, with three more weeks left. The group toured Clear Creek Hatchery on Wednesday this week, and go to Pack Forest on Saturday. Stream Stewards will wrap up at the Watershed Festival, which is on Saturday, Sept. 30, from 10:00am-4:00pm at the Refuge. Parking and shuttles will be available at River Ridge High School. The colorful wooden fish along the road to the Refuge are for the Festival, decorated by kids over the years. Flyers are available here at the Refuge, and the Festival is being promoted on Facebook and on Tacoma TV on 9/21. Eatonville Salmon Festival is not happening this year because of no capital budget. Justin also announced he has been selected for AgForestry Leadership program, a statewide program that has been running for 40 years. A third of this year's class is focused on conservation, which is high. It begins in October with three days once a month in fall, winter, and spring, and trips to DC and overseas (countries TBD). The program calendar conflicts with NRC meetings, so Justin won't be at the Council meeting again until January.
- *Salmon Recovery Update* – We are still looking for volunteers for Watershed Festival. Volunteers get free grilled salmon for lunch if they sign up for a two-hour shift. Peter, Volunteer Coordinator at the Refuge, can bring over a copy of the volunteer spreadsheet at break for people to sign up. Several people pointed out that it's a good activity for reliable high schoolers needing to fulfill community service requirements. Curtis might know soliders who want to volunteer for internship hours. Ashley reported on Salmon Recovery that Mashel 3 construction has concluded for the season, with 4 of 9 log jams completed, so the project will finish next year. There is no tree planting for NREP this year at that site, but there may be some on Land Trust property. The Nisqually Salmon Habitat Work Group toured the Mashel site last week. David reported that the Nisqually tribe has concluded its Chinook season as planned, with probably 30-40,000 fish returning. The run appears larger than forecasted – larger returns this year suggests a shift in the poor survival trends of the last four years. Part of fishing plan is to maximally seed the watershed with spawners, transferring fish from Clear Creek to the river to spawn naturally. The weir wasn't working as hoped, so this is next step in terms of recovery, and will hopefully help figure out what watershed can produce in terms of smolts. The Tribe's plan is to transfer 2000 fish, and they have already transferred 900 (which is a lot to see this early in the season). All of the transferred fish are jawtagged, so if you happen to find a dead one, write down number and call us. The Tribe is tracking each one, taking genetic samples, and will sample smolts as they leave so they can connect

offspring to parents and find out how productive the fish are as natural spawners. David expects they will continue doing this for 8 years. Of 900 fish planted so far at Centralia Dam, two are known dead from handling issues, which is not bad. Staff surveys have found 9 spawning fish in lower Mashel, about half with jaw tags, so they are starting to use that habitat. We should start to see Chinooks and pinks distribute through system. The pink run is not as big as in previous years but still pretty good (40-50,000). The coho season hasn't started yet, but forecast is abysmal due to indications of poor survival. Joe asked if there was any indication how many of the Chinook are wild versus hatchery. David replied that the tribe is just starting to survey, so we won't know until later. About 10% of population is usually of natural origin, and their return rates track pretty closely with hatchery fish. They are trying to track effects of selective fishing with wire tags in snouts. David estimated we would probably get around 1000 natural Chinook back this year. Hopefully, the smolts from the transferred fish will help jumpstart a returning natural population, which they can eventually start pulling back into the hatchery population once established. Roger asked if tagged Chinook are all being released above power plant, and David responded that they are going above diversion dam, and will start to release at power plant next week. They are using two release points to try to fully seed the area, and will alternate upstream and downstream releases through rest of season.

- Howard reported that Lakeside Industries' effort to bring a recycled asphalt plant is progressing. The county has called for a policy review and evaluation of Lakeside's proposal, which closes at end of month. The Nisqually Tribe is part of evaluation team. David will be the tribal representative in that process, and he stated that the tribal council is considering the policy based on bringing the best science to bear, so they need good consultants. Howard stated that the issue is of worldwide interest and an opportunity for this area.
- Curtis provided an update about the La Grande Dam trip on Sept. 2. Tripping at bypasses has been causing runoff dumping into flows, 800-850cfs. They are trying to figure out what that's about – they have new equipment, and suspect it's a combination of a mechanical and electrical issue. Justin reported that they noticed canal was lower than normal while floating yesterday. David noted that the canal is 2<sup>nd</sup> priority after minimum flows are met.

### 3. **JBLM Fish & Wildlife Program – Amber Martens, JBLM**

Presentation: <https://www.slideshare.net/Nisqually/jblm-fish-wildlife-program>

Amber Martens is a biologist in JBLM's Fish and Wildlife program (contracted through AGEISS Inc.) David Clouse is the program director, and oversees 5 federal biologists, 5 AGEISS contractors, and 1-3 contractors from Colorado State University, as well as interns and volunteers. The Fish and Wildlife Program is one of three entities, along with the Integrated Training Area Management Program and the Forestry Program, responsible for most land management activities in the JBLM Training Area. The program's mission is to protect, maintain, and enhance the various ecosystems on the installation to promote native biodiversity and support the military mission. JBLM's land management programs work to provide military personnel with varied and realistic training opportunities in diverse landscapes, improve fish and wildlife habitat, and control pest plants.

Amber passed around copies of the map cards provided to soldiers when they go out to train. They show a map of training areas on one side, color-coded with endangered species habitat area, and information on the back about the top three prairie species on base that soldiers need to know while doing exercises. The 96,000-acre base is made up of Fort Lewis, the former McChord Air Force Base, and Gray Army Air Field, with a total of 65,000 acres of maneuver area used for training activities. The installation includes 14,000 acres of prairie and grasslands, 4,300 acres of oak and pine savanna, and 4,500 acres of wetlands, with over 200 individual wetlands, 29 lakes. The JBLM Artillery Impact Area is western Washington's largest area of native/semi-native prairie. Seventeen miles of the Nisqually River pass through the installation, along with tributaries and streams including Clover Creek, Morey Creek, Lacamas Creek, Muck Creek, Murray Creek, and Sequelitchew Creek.

JBLM's Fish and Wildlife programs operate under a number of Army, base, federal, and state laws and regulations. Army Regulation 200-1 requires an Integrated Natural Resources Management Plan (INRMP) to provide for the conservation and rehabilitation of natural resources on lands used for military mission activities to ensure the preparedness of the Armed Forces. One component of the INRMP is an Endangered Species

Management Plan (ESMP), which are developed for all federally listed, proposed, and candidate species and critical habitat present on an Army installation. These ESMPs include management measures to protect, maintain, and if needed, enhance populations and their habitat. The INRMP and ESMPs ensure that the natural resources under the stewardship of the Army and JBLM are managed simultaneously to support endangered species, while providing as much as possible for no net loss of training or military capability. Fort Lewis 420-5 is an appendix to AR 200-1. This regulation lists all the endangered species found at JBLM and associated restrictions to training and recreating at JBLM to protect species and habitat. Fort Lewis (FL) regulation 200-1 restricts vehicle traffic and construction activities within 50 meters of wetlands. Dismounted training is allowed within the 50 meter buffer as long as it does not alter the habitat structure. JBLM also follows all federal conservation laws, including the Endangered Species Act, which requires agencies to ensure that agency actions are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat.

The Fish and Wildlife Program conducts surveys and habitat enhancement for numerous species of conservation concern, including prescribed fire, which provides both noxious weed control and increased training opportunities. Mazama pocket gopher, streaked horned lark, and Taylor's checkerspot butterflies are the top three endangered species found on the prairies and grasslands at JBLM. Coordination with the Fish and Wildlife Program is required prior to training missions within their habitats. Wetlands and riparian areas are another hotspot for endangered plants and animals. These areas are primarily regulated by the Clean Water Act and Fort Lewis 200-1. Threatened and endangered species found in aquatic systems include Puget Sound Chinook and Steelhead (Nisqually River/ Muck Cr.), 3 species of Rockfish (Puget Sound), and Oregon spotted frog and water howellia (wetlands). Fish and Wildlife also conduct raptor surveys on all timber sales, and western gray squirrel surveys in the oak woodlands. There is also a small amount of potential spotted owl habitat on JBLM, but the species is not present.

#### Individual Species Data:

*Taylor's checkerspot butterfly.* Per USFWS, butterflies can be accidentally killed in military training activities, as long as JBLM follows procedures to minimize individual death (not allowing vehicles to drive offroad) and continues to work to improve butterfly habitat. Populations are hard to estimate because the butterfly stage of the lifecycle lasts only one to two weeks, and conducting surveys during that window has to be balanced with the need to continue training in the Artillery Impact Area. The artillery training activities actually support the butterfly habitat by causing regular burns on the prairie. JBLM has partnered with UFWWS, WDFW, and the Oregon Zoo on a captive growing program for the butterflies, which has been fairly successful. The base has a self-sustaining population in one area, with two more still releasing.

*Streaked Horned Lark.* The larks are partially migratory, moving south to the Willamette valley and coastal Oregon sites in the winter and spending breeding season at prairie sites at JBLM. They are ground nesters, making it hard to see nests, so the base restricts vehicle traffic to emergency situations only during nesting season (Feb. 1-Oct.1). Birds also love airfields, so CNLM marks nests and notifies mowers so they don't run them over. After fledglings can fly, prescribed burns in the prairie help preserve the habitat. Fish and Wildlife has put up game cameras on some nests to investigate nest failure – predation is the most common reason. Western meadowlarks steal eggs, which came as a surprise to biologists! They also do bird banding to track individuals.

*Mazama Pocket Gopher.* The Mazama pocket gopher, a small endemic pocket gopher found only in western Washington, western Oregon and northern California, is losing habitat to development and invasive species like Scot's broom. Pocket gophers prefer deep, rich, light-textured and well-drained soils vegetated with grasses and forbs, where they can dig tunnels resulting in distinctive fan-shaped mounds. Soil compaction can have a major effect on gopher populations, limiting their ability to tunnel and impeding vegetative growth. Gopher tunnels provide shelter for other animals as well as aerate the soil, promoting growth of the native vegetation. That is why MPG, like beavers, are considered ecosystem engineers. Digging in prairies occupied by Mazama pocket gophers is strictly prohibited at JBLM and all digging in training areas require coordination with JBLM F&W Program. Prescribed burning is the best method of controlling Scot's broom and other invasive species.

#### Woodland Habitat Restoration:

Woodland habitat restoration is prioritized based on high-priority habitat areas, as well as maintaining areas that have received intensive restoration activities already. JBLM carries out prescribed burnings and mowing, and sometimes herbicide, to control Scot's broom, blackberry, and other invasives. They also practice slashing and thinning for oak release (3 acres for Mazama pocket gopher habitat, and 10 acres for Ponderosa Pine habitat). The goal is to prepare these areas so they can survive prescribed fire as the main maintenance strategy. Last year, they burned 330 acres of oak and planted 940 oaks. They are also assisting WDFW with the statewide Western Gray Squirrel survey to assess occurrence and distribution of habitat via hair snag tubes with walnuts inside.

#### Wildfire vs. Prescribed Fire:

Unintentional wildfires on JBLM are most often caused by training activities, such as the use of tracer ammunition. Last year's fire was one of those. During high assessed fire danger periods, units have to get permission from the Forestry Program to use fire hazards in training. Forestry manages wildfires on the base.

Prescribed fires are intentionally ignited and of short duration (45-60 min of ignition) to reduce fuel loads for wildfires, allow soldiers and airmen to train, and preserve habitat. The Fish & Wildlife Program is in charge of prescribed fires. They burn different areas every year, to create a mosaic of habitat and training areas, and work to minimize wildlife casualties by identifying habitats to exclude, use ignition patterns to chase wildlife out (starting from one side rather than ringing the whole thing, giving channels out).

#### Aquatic systems:

*Water Howellia*. Threatened annual aquatic plant that occurs in ephemeral kettle wetlands. Historically found in open prairies, today it mostly occurs in conifer forests. JBLM has around 23 wetlands with Howellia. It's difficult to survey for, due to growth form, water clarity, a non-native lookalike, and ability to survey without disturbing the plants. However, it rarely moves between wetlands, so it's usually found in same locations. They survey annually for habitat disturbance, and every three years in the spring for population status.

*Oregon Spotted Frogs*. Last collected on base in 1959. They were recognized as a distinct species from Columbia Spotted Frog in 1995, listed as endangered in WA in 1997, and federally in 2014. The first re-release of juveniles on base was in 2008, and 7344 individuals have been released since then (as of 2015, the last release). Egg masses were found in 2011 – only evidence of breeding, not seen since. The Fish & Wildlife program conducts population monitoring and has started environmental DNA analysis, collecting water from surface and analyze for presence of frog DNA. Management strategy focuses on habitat enhancement by removing vegetation (reed canary grass, aquatic noxious weeds), emergent vegetation mats via seed collection and cultivation at Sustainability in Prisons project. One release site is doing quite well, one not so much.

*Salmon and Steelhead*. Work has focused on habitat enhancement and surveys, conducted annually. Limited funding for last 2 years has reduced ability to do habitat management, so the emphasis has been on capitalizing on previous work with follow-up treatments. Partnerships increase accomplishments: willow staking with NREP, treating 7 acres of reed canary grass in Muck Creek with volunteers.

On base, violations of the Endangered Species Act incur regular penalties (civil or criminal sanctions) – government employees are not immune. All civilians and military personnel must follow posted signs, rules, and SOPs for training areas and ranges, pay attention to signs and Seibert stake boundaries. Most violations occur when people ignore signs (no vehicle access, no digging, no civilian access without a permit, no horseback riding except on roads with a permit.) Civilian access permits are easy to get. JBLM also has a PDF map available for smartphones via the PDF Maps Mobile app by Avenza Systems, which helps navigate through training areas and avoid endangered species. The most recent version of the Environmental Coordination Map and Map Booklet can be found at the Range Support website. Once the app and map are downloaded to your Apple or Android phone or tablet, the app can display where you are on the Environmental Coordination Map so you can check to make sure you are in an area where, for example, off-road maneuver is allowed. Once you download georectified PDF map files for an area, no cell connection is required.

#### Questions:

- Roger asked if the cross-base highway plan goes through oak stands. Amber wasn't sure, but if it were to happen, they would discuss mitigation techniques.

- David asked about take issues with listed species. If take is exceeded, for example with streaked horned larks, does training have to halt or move? Amber: haven't had much take in lark areas. Access is pretty restricted about not allowing driving in the area, biologists are out there every day monitoring nests to record what does happen. David asked her to report back with information about what happens if take is exceeded. Amber explained that the base has clear schedules, so they know who's using a given area for training, and if there are tracks in habitat area, there are formal litigation tracks to pursue with the appropriate entity. They also have environmental law enforcement on base, recording information about use, and carrying out suits against units that violate. They do restoration work afterwards (funded by violator fines). Fish and Wildlife and command is working hard to improve communications with all personnel on sign-off on training plans, and on hold higher officials accountable (personally) for violations of ESA.
- Fred remarked that this is a very unique, huge program. In spite of impact on tribe, that the base still looks about how it did 40-50 years ago is remarkable. We all appreciate the work that goes into making this a unique place.

#### 4. **Mt. Rainier Institute Field Guide Project - Amy Wilson**

Presentation: <https://www.slideshare.net/Nisqually/mount-rainier-institute-field-study-guide>

The Mount Rainier Institute (MRI) is located at the UW Pack Forest, right in the middle of the watershed. MRI's mission is to "provide outstanding nature-based education experiences that are rooted in science and nurture the next generation of environmental stewards and leaders." Amy Wilson is MRI's Environmental Education Coordinator, and worked on the field study guide project with Institute as part of her recently-completed master's in environmental education from Montreat College.

The Field Guide Project was developed for MRI's Residential Environmental Education Program of UW, run in official partnership with Mt. Rainier National Park. The primary audience is middle school students within 90 mile radius of Pack Forest (out to the coast, the WA/OR border, and north to Everett). It focuses on the intentional use of science in environmental education, and emphasizes place-based learning: how does this mountain impact you in your daily life?

A typical field trip is four days and three nights, with students in trail groups of up to 11 kids with one staff member.

- Day 1: arrive, settle into cabins at Pack Forest, do activities that present a balanced point of view on how humans benefit from nature (economic – timber cruise, use tools & calculations; (ecological – lichen surveys on air pollution; cultural – solo sit in the forest for 5-10 minutes with a prompt to think about). Middle schoolers are just starting to figure out their land ethics, so MRI wants them to get a balanced perspective and think about these things with a focus on their own region and lives.
- Day 2: go up to old growth area in Pack Forest early in the morning, and develop a field study project that students design themselves. Staff are trained to take the interests that students express and find some field study questions that they can work on in the forest, looking for scientific ways to answer those questions.
- Day 3: visit Mt. Rainier National Park, Longmire & Paradise, learn about how the mountain impacts their daily lives (weather, geology, life zones), discuss the glacier if they can see it and talk about the Nisqually watershed.
- Day 4: trail groups present their field studies to the rest of the group.

Amy's project to develop the Field Study Guide came about from a review of staff feedback as MRI headed into its 4<sup>th</sup> year.

- The program needed a guide for staff to lead the 8-hour field study day.
- Staff knowledge and training needs varies a lot from season to season. Many come from outside of the area, so written manual helps support educators to be informed about the Mt. Rainier/Nisqually region.
- Full official Next Generation Science Standards (NGSS) are coming online fully this year. Schools begin testing on those this year, holding teachers accountable, so field study needs to be aligned.
- Provides a theoretical framework for MRI's model, based on Kolb's Experiential Learning Cycle, NGSS, and Understanding By Design.

- Opportunity to intentionally integrate best practices from literature review of environmental education, either empirically tested and researched-based or “folk” practices.

Key terms:

- *Environmental Education* – A pedagogy that aids students in gaining knowledge about the environment, developing skills, and creating understanding in how to address local and global challenges (NAAEE, 2016).
- *Experiential Education* – A pedagogy where students learn through direct experiences (Dewey, 1997).
- *Kolb’s Experiential Learning Cycle* – A four stage learning cycle that can be entered into at any point but then must be followed in sequence thereafter. The stages of the learning cycle are, abstract conceptualization, active experimentation, concrete experience, and reflective observation (Kolb, 2015). It is a prevalent strategy in environmental education, this model allows you to begin at any point in the cycle, as long as you continue in sequence from there. It’s helpful to have multiple entry points, especially in outdoor education when you’re sharing space with others, because you can start with model (i.e., draw old growth forest) then walk trails; or walk trails, then reflect, then model. It’s focused on educating the whole person.

Best practices from literature review:

- Active participation
  - strategies that involve students do better at fostering attitude and behavior changes than didactic methods (i.e. Charlie Brown teacher voice)
  - important in memory recall
  - creates inclusive learning communities
- Cooperative learning
  - uses all students’ knowledge and observations for a more complete view of topic at hand
  - today’s students interact with each other through media, so it is imperative to use cooperative learning because they look for the connection. But they also need structure to be able to work together in educational setting.
  - use in a structured, complex environment (complex so everyone HAS to stay involved and has enough for all brains to be engaged)
- Immersive field investigation (data collection & analysis)
  - helps in skill acquisition and refinement
  - higher rate of learning transfer (transferring knowledge to new and different situations, greater critical thinking)
  - positive gains in knowledge, attitude, and BIG in behavior
  - like in all educational studies, gains from a given intervention are very small, and there’s very little empirical research
- Place-based education
  - creates attachment to place via practices (time outdoors, stewardship projects, use of local resources)
  - encourages admiration of local environment. Have “whoa” moments all of the time with students at MRI – after seeing a woodpecker for the first time, a student exclaimed “I can’t wait to go home and see if there’s any around my house!”
  - increased awareness comes from interacting with the environment
- Pure inquiry (learners develop, refine, and conduct investigations with minimal instructor help)
  - most authentic way to practice science
  - can transform a student’s perception of science: instead of thinking of it as a checklist, it requires you to think about all the factors (is it raining today? How will you collect information? etc.)
  - requires critical thinking about the process
  - moving from structured (teacher controls experience) to pure inquiry (teacher is part of the team that’s going through the experience) puts students in control
- Reflection
  - allows students to reflect on emotional and sensory aspects – very important application for environmental ed, because students have more to talk about. In a classroom, you can only reflect on knowledge, but when you’re outside you have sights, sounds, touch, etc. to reflect on

- positive impact on environmental attitude

Methodology in creating field guide:

- Theoretical framework:
  - Understanding by design (curriculum starts with end in mind – what should students know by the end of lesson/day, work back from there);
  - Kolb
  - NGSS: Science & Engineering Practices, Crosscutting Concepts, Core Ideas (WA adopted 2014)
- Expert panel:
  - Teachers using NGSS (because of communication issue, didn't get MRI teachers this year, but will get feedback this year)
  - EE professionals (wide geographic distribution)
  - MRI instructors (past and present)

Guide contents:

- All materials and activities are tightly tied to curriculum objectives
- Know how to assess questions for how much time, materials needed, etc.

MRI links traditional environmental education with science practices, to achieve EE goals through science activities/field studies, and place-based learning. It wants students to have a space to investigate a topic they're interested in.

Questions:

- MRI targets middle school students because it fills a gap: there are lots of residential EE programs in western WA that serve 4<sup>th</sup> and 5<sup>th</sup> graders, but very little for middle schoolers.
- MRI has some high school programs as well, often AP Environmental Science classes.
- Have to schedule with individual teachers – some bring whole class, whole grade out.
- Cost varies - UW heavily subsidizes programming (MRI is funded via Pack Forest, a self-sustaining entity within UW). Total cost is \$290/student, but teachers often do fundraising or grants.
- Staff training takes place for two weeks before school programming starts, with a mock program (returning staff teach new staff the same way they'll teach students).
- Recruiting/marketing: about to get to point where program is at capacity. John Hayes works his network to recruit teachers. MRI is a partner on NREP grant (Creating Resilient Communities with Climate Change Education).
- What form does reflection take? Every activity in the guide has its own reflection – prompt writing, group discussion, drawing something out, sentence completion (“I found this activity easy/hard because...”)

## 5. For the Good of the Order

- Frogs are out on the leaves at the refuge!
- MRNP has fisheries management plan out for review, deadline in October. If anyone has comments, it's worth a read.

## 6. Adjourn

The meeting was adjourned at 11:58 am.

*Next Meeting: Friday, October 20<sup>th</sup>, 2017, UW Pack Forest  
NWSP Topic: Integrated Communities*