Long Tom Watershed Council Conservation Strategy

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Introduction to the Conservation Strategy

Purpose: This document is the strategic outline of how the Long Tom Watershed Council ("Council" or "LTWC") will achieve its mission over the long-term, approximately 20-50 years. We aim to update it every 5 to 6 years. From this document and the strategic plan, the Council builds work plans that include specific projects and actions for each 2-5 year period. This document may be helpful to the following people in the following ways:

- **Council –** To have a clear and data-based strategy for each watershed goal and a set of recommended priorities for conservation and restoration that are geographically specific enough that we, the Council as an organization, can develop and evaluate action opportunities.
- **Scientists** – To have a comprehensive picture of conservation and restoration opportunities in the Long Tom Watershed, both terrestrial habitat and aquatic, within the Willamette River basin context.
- **Land managers, land owners, and residents of the watershed** – To understand the current situation for different water quality and habitat elements, the Council's agreed-upon goals for them, why they are important, and what the opportunities are for addressing each. To provide enough information and resources to enable people to take action for watershed improvement, or to be able to ask for help when considering action.

Status: This Conservation Strategy is intended to be a working document. In this version, the restoration priorities for aquatic and terrestrial elements of the watershed are fully developed and spatially explicit, while the monitoring strategy is in draft stage and the Council's approach to some issues and threats (e.g. urbanization, climate change) has not yet been documented.

Organization and Terms:
Aquatic and Terrestrial categories: In this strategy document, one set of priorities focuses on aquatic habitat, stream processes, and water quality. The second set addresses terrestrial habitats. There are obvious interconnections between these two elements of a watershed, but we chose to separate them in order to avoid artificially prioritizing one over the other and to allow those who focus on one to see those priorities clearly. Within the Aquatic and Terrestrial categories, priority is implied by the order of the list.

Species considerations: In this document, the "typical species" are used to paint a picture of each habitat and may help indicate the habitat's function and value in the watershed. Within that list, federally listed threatened or endangered species are underlined. However, the Long Tom Watershed Council's restoration and enhancement program is focused on habitats as opposed to species-level conservation. When an at-risk[1] species occurs on a project site, the project site plan will include the specific needs of that species[2].

Ecological Goals: Throughout this document ecological goals are stated for each parameter and habitat. These goals are presented together in Appendix A. The Long Tom Watershed Council ("Council", or "LTWC"), the LTWC Steering Committee and the LTWC Technical Team approved these ecological goals in 2004. Staff from the Oregon Watershed Enhancement Board (OWEB) reviewed them and provided feedback during this local approval process. These

priorities are now included in the document *Willamette Basin Restoration Priorities*, available from OWEB or on the web.

Maps: Regarding the maps that are referenced in this document, the mapping of priorities is included only to assist in depicting the priorities described in the text. Discrepancies are not intended to confuse the evaluation of priorities and the development of projects. The LTWC Technical Team's recommendations will supersede the maps and written priorities as necessary to include the most current scientific understanding and knowledge of watershed conditions.

Additional or related priorities: Finally, more detailed priorities and monitoring strategies may exist or be developed for select sub-watersheds, regions or habitats. For more information pertaining to the Council's priorities, please review other documents available on the website, or contact the authors.

Acknowledgements

The authors thank the Technical Team of the Long Tom Watershed Council, in particular Steve Smith (USFWS), Gary Galovich (ODFW), and Ed Alverson (the Nature Conservancy) for informing and reviewing these restoration priorities for aquatic and terrestrial habitats. This does not indicate their full endorsement of these priorities. The Council enjoys an ongoing relationship with these individuals and the agencies and organizations they represent, among many others, in the pursuit of watershed health.

AQUATIC

Typical species: Cutthroat trout and spring Chinook are the native salmonid species in the watershed. Juvenile spring Chinook seasonally migrate from the Willamette River to rear in the lower Long Tom River. Fluvial cutthroat trout migrate from the Willamette to streams in the lower Long Tom for spawning, juvenile rearing and refuge. A separate group of fluvial cutthroat migrate among the streams in the upper portion of the watershed, but are blocked from the lower part of the basin and the Willamette River by Fern Ridge dam. Resident cutthroat trout are both above and below the dam where watershed conditions support them. Oregon chub were historically present and may be reintroduced. Pacific lamprey and western brook lamprey, both state-listed sensitive species, are likely present and spawning in the basin. Significant native amphibian and vertebrates present in the basin are the western pond turtle and red-legged frog.

Status and Priority: Changes to channel morphology, instream habitat, hydrology, riparian zones, and water quality and reduced access to historical spawning and rearing areas have negatively affected the productivity of all life-stages of cutthroat trout and rearing of juvenile spring Chinook. The amount of available spawning habitat for fluvial cutthroat trout in the watershed has been reduced by 70% due to lack of fish passage at Fern Ridge dam. Similarly, lack of passage at Fern Ridge has reduced rearing habitat for spring Chinook by 70%. This makes the quality of and access to spawning and rearing habitat below the dam, in the Bear and Ferguson Creek sub-watersheds, particularly important.

Connectivity/Passage

Status and Priority: This is a top priority because passage allows fluvial and resident cutthroat trout, spring Chinook, and other aquatic species, including amphibians, access to higher quality habitats at certain life-history stages, and as stream conditions change seasonally. Dams and impassable culverts prevent these species from reaching critical spawning habitat and refuge during the summer and winter, and block access to refuge habitat as stream conditions change seasonally. Where temperature problems exist in specific areas the need for refuge is further increased.

Ecological Goal:
Unrestricted passage for a variety of aquatic species to stream reaches that include breeding and rearing habitat and summer and winter refuge. Note: this excludes natural barriers.

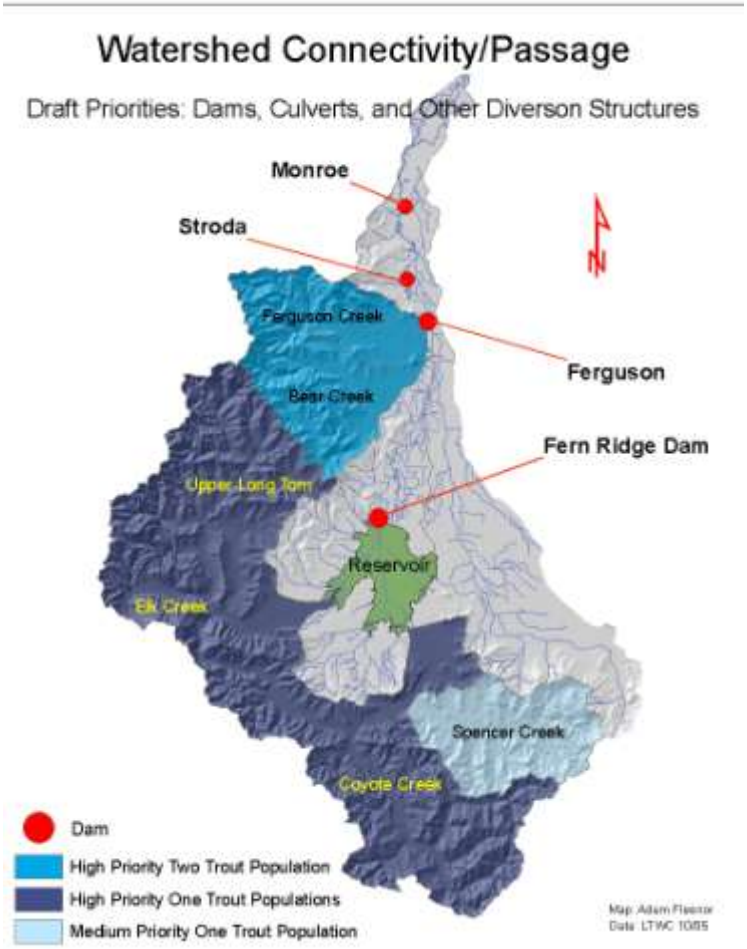
Mainstem Barriers

Address fish passage at barriers on the mainstem of the lower Long Tom River

Geographic Priorities:

- Fern Ridge Dam
  Complete barrier. Removal highly unlikely. Watch for opportunities to provide fish passage over or around. Fish passage here would reconnect the entire basin's fish populations.
- Monroe Drop Structure
  Passes adult trout only under some conditions but does not pass juvenile trout or Chinook salmon. Analyze potentials for improving fish passage.

- Stroda Drop Structure
  Hydraulic modeling results indicate this is a barrier at all flows for juvenile trout, and at some or most flows for adult trout. This blocks access to Ferguson Creek and Bear Creek habitat for fish migrating from the Willamette.
- Ferguson Drop Structure
  This blocks passage to Bear Creek habitat from the mainstem Long Tom River. A bypass exists at some flows via a historic segment of the Long Tom River.



Possible Project types[3]:
Barrier analysis, dam/drop structure modification or removal, fish passage structures (FPS), provide fish passage alternatives; monitoring.

Culverts, small dams and other diversion structures

Status and Priority: Replace culverts, remove or provide fish passage over small dams and other diversion structures.

Geographic Priorities:

- Lower basin
  - Ferguson sub-watershed, Bear sub-watershed
  - Other tributaries to the lower Long Tom River

  High priority for resident and fluvial trout, Chinook salmon
- Upper basin
  - Upper Long Tom, Elk, Coyote sub-watersheds
    High priority for resident and fluvial trout
  - Spencer sub-watershed
    Medium priority for resident and fluvial trout

Considerations for project prioritization*: Lower basin:* amount, type, and quality of habitat to be opened up, as well as position in the sub-watershed (with downstream positioned culverts being higher priority depending on suspected fish use – e.g. resident or fluvial trout, Chinook). Gather specific data on each potential barrier, then correct passage problems. *Upper Basin*: amount, type, and quality of habitat to be opened up,

more than position in the basin, due to the presence of resident as well as fluvial cutthroat trout in this area of basin.

Possible Project types:
Barrier inventory, fish passage structures (FPS), small dam removal, alternatives to push-up dams (APD), correcting road/stream crossings (CRSC), culvert removal, replacement or modification, provide fish passage through or around impoundments, screen diversions; monitoring.

Watershed Process & Function

Status and Priority: Re-routing, straightening, and subsequent down-cutting of many valley bottom streams has led to disconnection of streams from their floodplains, leading to greater scouring of channel bottoms during flood events, less deposition of gravel and fine sediment, and a loss of material and nutrient flows between the floodplain and channel. Fern Ridge Reservoir has altered historic habitat in a number of significant ways. First it blocks upstream fish passage to the good-quality habitat in the upper watershed. Second, sediment trapping and flood control by the dam change the amount and timing of sediment flow and distribution and affects floodplains downstream. Because there is now less flooding downstream of the dam, sediment that used to be dropped out in the floodplain ends up in the Willamette River. Third, the shallow nature of the reservoir leads to higher summer water temperature and higher winter turbidity levels in the lower Long Tom River. A natural flow regime that mimics pre-dam conditions for the lower Long Tom River, including low flows, pulses and overbank flows, was important for supporting native aquatic organisms and their food sources.

Addressing watershed process and function is a top priority in order to expand cutthroat trout distribution and access to habitat, as well as the habitat for other aquatic species. Habitat emphasis includes flow, riparian area functions and channel complexity and hydrologic processes. Groundwater recharge is not a specific focus but is improved through project types that address hydrologic process and wetland habitat.

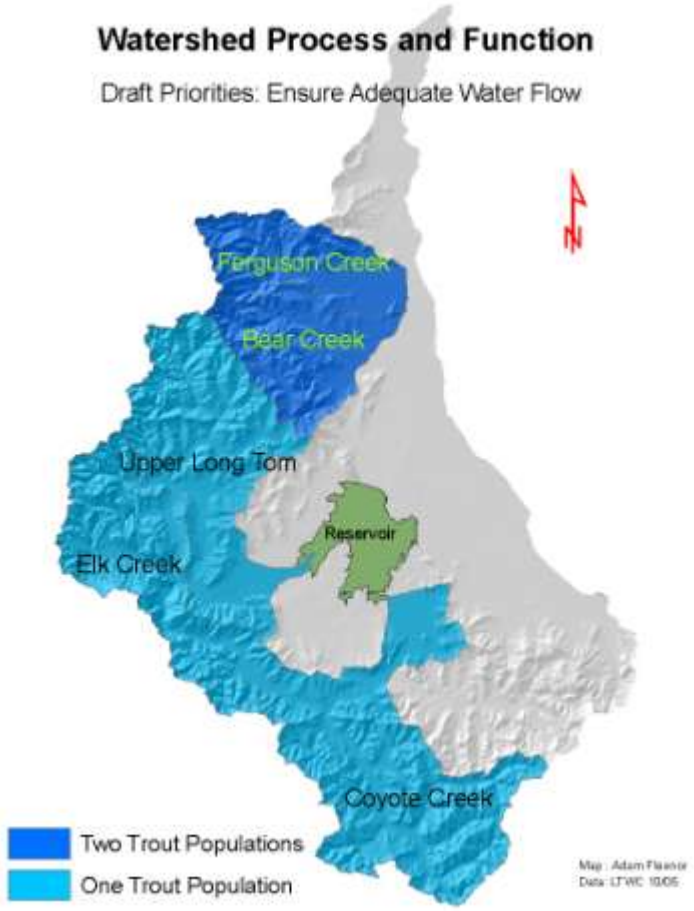
Ecological Goals:
Streams with sufficient channel complexity to support native fish and other aquatic species. Riparian zones that provide a high degree of ecological function with an absence of invasive non-native species. Streams that exhibit a natural hydrologic regime, such that they interact with their floodplains to reduce peak flows, increase base summertime flows, exchange nutrients, promote groundwater recharge, and provide off-channel habitat.

Ensure Appropriate Water Flow

Status and Priority: Where flow is limiting habitat availability for native species, ensure a more natural flow regime, especially to ensure minimum flows. Temperature is the primary limiting factor to the distribution and productivity of cutthroat trout and a diversity of native aquatic species. This is based on ODFW information that trout will use streams with poor physical habitat, albeit at lower densities, as long as temperature is suitable. Flow affects how much habitat is available, and provides dilution for pollutants.

Geographic Priorities:

- Ferguson sub-watershed, Bear sub-watershed
  High priority for resident and fluvial trout, Chinook salmon
- Upper Long Tom, Elk, and Coyote sub-watersheds
  High priority for resident and fluvial trout
- Lower Long Tom sub-watershed
  Fern Ridge contributes flow; consider establishing instream right.



Possible Project types:
In-stream water enhancement (IWE); irrigation efficiency projects (IEP); re-establish minimum flow recommendations for the mouths of all sub-basins (except Lower Long Tom); in-stream water rights; education on conservation; other projects that restore hydrologic processes; collecting data on restoration effectiveness through site-specific monitoring techniques; analyzing data provided by the partnership to determine restoration opportunities and technique effectiveness

Restore Riparian Area Function

<u>Status and Priority</u>: Significant limiting conditions to proper riparian zone function in the watershed include: loss of large conifers in the upper reaches, loss of bottomland hardwood forest, replacement of trees and native shrubs with invasive species, grasses, or bare soil, and an overall reduction in the density and number of trees in riparian areas. In some cases, the loss of function is due to a streamside wetland or prairie area being overgrown by forest. Almost 60% of riparian areas had moderate to high loss of ecological function due to one or more of these causes. Loss of shade contributes to warmer stream temperatures, which has had a significant impact on cutthroat trout. In addition, many species depend wholly or in part on riparian habitat and have been negatively affected by this loss in function (see also, Terrestrial section)

Restoring riparian area function is a high priority throughout the watershed. Healthy and well-functioning riparian areas provide a host of water quality and habitat benefits, and creating and sustaining these areas is a relatively simple and cost-efficient restoration option. In addition, restoration actions taken to achieve this goal directly benefit others, especially channel complexity and water quality. Restoring riparian function is important especially in areas where channels have been straightened and loss of stream-flood plain interaction has occurred, and/or

where channel migration has been limited, and therefore natural formation of channel complexity is limited. And in areas where channels have not been straightened or banks have not been armored, riparian restoration is important because it will be easier to achieve healthy riparian function.

Geographic Priorities:

- *Along the lower Long Tom the areas without levees are more important than those with levees.*
- *Other priorities will be determined by site characteristics that make a potential action higher priority.*

Some site characteristics to be considered higher priority:

- Links existing riparian habitats
- Restores riparian areas that lack any other channel complexity because they are straightened
- Restores riparian area at a site where focal or at-risk species can be benefited
- All things being equal, project sites are considered higher priority relative to other projects as they affect longer stretches and on both sides of the stream and/or achieve larger riparian zone widths (in proportion to stream size).

Possible Project types:
Riparian vegetation planting (RVP); removing invasive species; riparian fencing (RF); off-channel watering for livestock (LWO); riparian conifer restoration (RCR); native shrub and forb filter strips; Beaver management (BM); Conservation Easements or agreements for high-quality areas (RCP); Riparian Area Enhancement (RAE); other projects that restore hydrologic processes; monitoring.

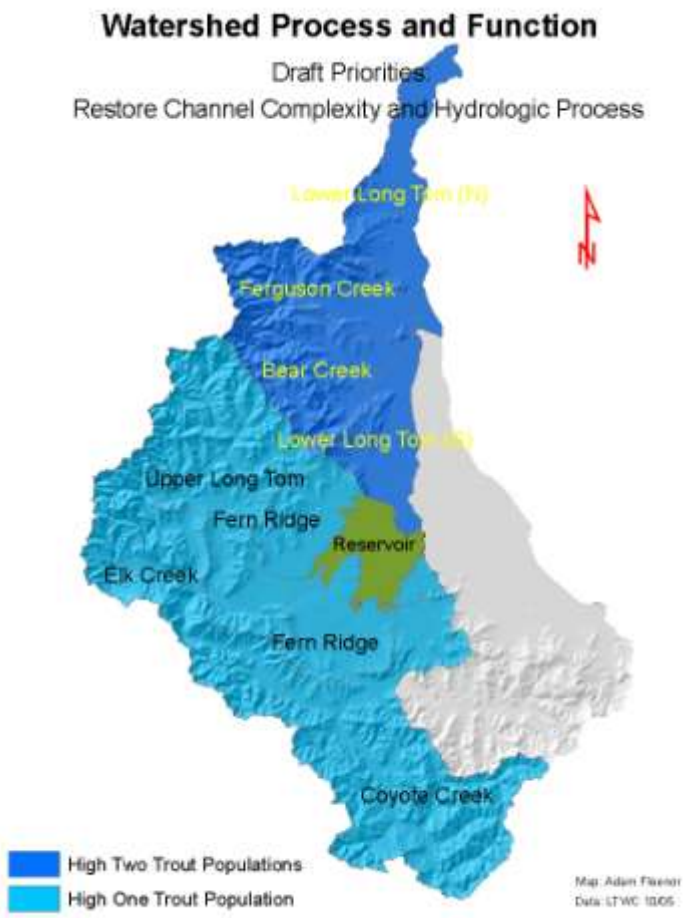
Restore Channel Complexity and Hydrologic Processes

Status and Priority: Hydrologic processes include different states of flows: low flows, within-bank pulses, overbank flooding, and flushing flows that remove fine sediment and mobilize the bed material. In restoring hydrologic processes, it is important to consider both the flow magnitude and flow duration for these different sates of flows. Channel complexity refers to in-channel features, including channel sinuosity, variability in slope, depth and bed characteristics, and cover provided by large woody debris and other components. Native aquatic organisms are adapted to channels with complexity, and loss of complexity may negatively affect them.

Restoring hydrological processes and channel complexity is a holistic way of ensuring the health of native aquatic organisms.

Geographic Priorities:
This is a priority in mid- to lower-reach habitat.

- Ferguson, Bear, and Lower Long Tom sub-watersheds
  High priority for resident and fluvial trout, Chinook salmon
- Upper Long Tom, Elk and Coyote sub-watersheds
  High priority for resident and fluvial trout
- Spencer, Upper Amazon, Lower Amazon, and Fern Ridge Tributaries sub-watersheds



Possible Project types:
Stream Habitat Enhancement (SHE) and Channel and Bank Alteration (CBA); reconnecting and restoring flow to historic channels (RHC); develop meanders and side-channels (DMSC); expand and restore floodplain such as with in-stream high-flow channels; streamside terracing and bank sloping (BS); off-channel habitat creation (OCHC); large wood placement (LWP); in-stream and hydrologically-connected wetland restoration (WE); other project types to increase floodplain interaction and move important parts of the watershed toward more natural hydrologic regimes; other project types that restore hydrological processes themselves (instream flow restoration broadly including; low flows, pulses, overbank flows); other project types that specifically support turtles and amphibians; monitoring.

Water Quality

Status and Priority: Limiting conditions caused by water quality include 1) high summer water temperatures and low dissolved oxygen levels in the mid and lower portions of the watershed, 2) high nutrient levels in streams running through the urban and heavily irrigated agricultural lands, 3) high turbidity levels in the Long Tom River below Fern Ridge Reservoir, some portions of Coyote Creek, and upper Amazon Creek, and 4) high E. coli levels in the upper Amazon, Ferguson, and Bear Creek sub-watersheds. These water quality conditions limit cutthroat trout and other native fish production in many parts of the watershed, negatively impact spring Chinook rearing habitat on the lower Long Tom, and, in the case of E. coli, pose a risk to human

health. No instream water rights currently exist in the Long Tom Watershed, however anecdotal information from long-time residents suggests that summer stream levels are lower than historically. Low summer flows contribute significantly to high summer water temperature. Poor water quality can have not only a local impact, but a downstream impact on the Willamette River and further.

This category focuses on efforts to improve water quality not already addressed by restoration of watershed processes and functions. It highlights specific water quality goals that need to be addressed to meet water quality standards set by the Oregon Department of Environmental Quality (DEQ). Our geographic priorities were developed from Council water quality data as well as DEQ water quality limited streams in the watershed. The priorities address limiting factors to aquatic life and human health. Notably, two municipalities obtain their drinking water from sources within the watershed – Veneta and Monroe. Both rely on wells. Veneta currently faces issues relating to quantity. Monroe is located within the Southern Willamette Valley Groundwater Management Area and contamination by nitrates is of primary concern.

Ecological Goals: Water quality and quantity conditions, including groundwater, that support viable populations of native aquatic life. Sediment delivery to streams that is within natural range of variation in both timing, character, and amount so that no adverse effects occur to native aquatic organisms.

Decrease water temperature and increase dissolved oxygen

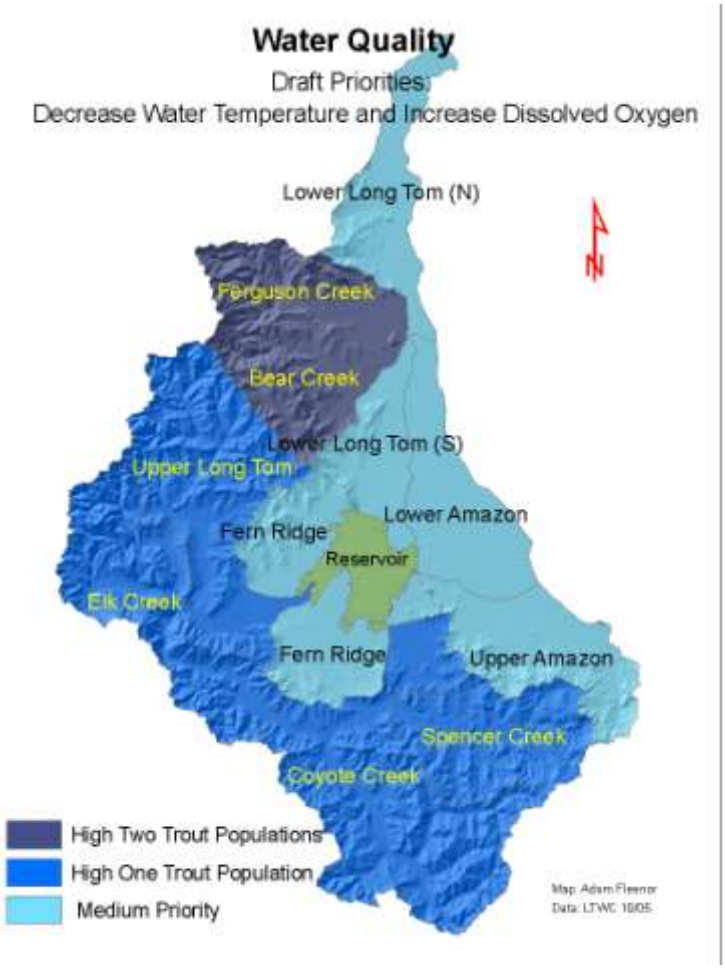
Status and Priority: Temperature is the primary limiting factor to cutthroat trout productivity and this makes all fish-bearing streams a priority. Due to Fern Ridge Reservoir acting as a heat sink, sub-watershed improvements may not contribute significantly to cooling in the Willamette. Individual sub-watersheds are prioritized based on fish populations and use. This is based on ODFW data showing that trout will use streams with poor physical habitat as long as temperature is suitable. See also the previous section on ensuring adequate water flow.

DEQ Water Quality Limited Streams: Ferguson Creek (temperature); Coyote Creek (DO), Amazon Diversion (DO).

Additional Water Quality Limited Streams for temperature and DO (per Council data): Long Tom River below the dam, Lower and Upper Amazon Creek, and the lower sections of Upper Long Tom, Elk Creek, Bear Creek, Spencer Creek and Fern Ridge tributaries.

Geographic Priorities:
None of the major tributary streams meet the state temperature standard along their middle and lower reaches. The upper, forested stream reaches meet the standard all or most of the time. Dissolved oxygen data follows a similar trend compared to the state standard for cold-water aquatic life.

- Ferguson, Bear sub-watersheds
  High priority for resident and fluvial trout, Chinook salmon
- Upper Long Tom, Elk, Coyote sub-watersheds
  High priority for resident and fluvial trout
- Spencer (seasonal), Upper Amazon, Fern Ridge Tributaries, Lower Amazon, Lower Long Tom sub-watersheds
  Medium priority



Possible Project types:
Those that produce shade and increase flow: Riparian Area Enhancement (RAE); riparian vegetation planting (RVP); riparian fencing (RF); off-channel watering for livestock (LWO); education and monitoring to reduce or eliminate use of fertilizers which can contribute to nutrient loading in streams; Conservation Easements or agreements for high-quality areas (RCP); monitoring.

Pesticides and Toxins

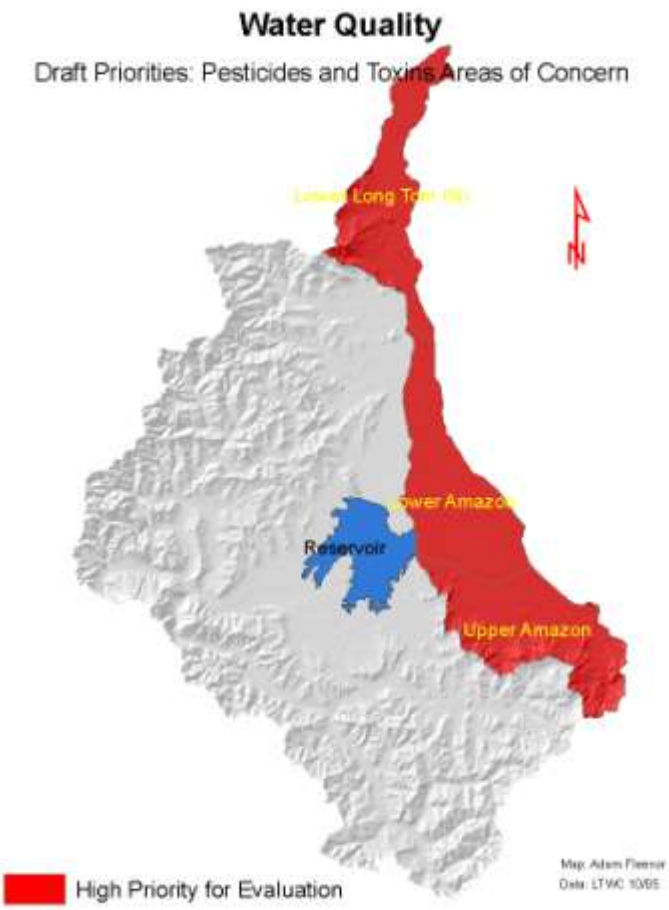
<u>Status and Priority:</u> USGS Willamette River Water Quality report findings suggest a reduction in pollution levels is needed in the Long Tom River Basin. This could be a significant limiting factor threatening aquatic health, yet specific geographic data is sparse, and collection is limited due to the prohibitive cost. Acute levels are especially important as they can quickly impair or kill aquatic life. High levels are transferable and become a problem downstream also. Pesticides and toxins are not only a local problem, however, and the types of actions it requires to change the pollution sources and levels suggests an approach needs to be prioritized and addressed at a larger scale than the individual watershed.

DEQ Water Quality Limited Streams: Amazon Creek (arsenic, lead)

Additional Water Quality Limited Streams (per Council data): no Council data; collection of data or review of current and relevant studies is a priority.

Geographic Priorities:

- Upper Amazon – *high priority as we assume that this is the likely source of significant pollution contribution.*
- Lower Amazon, Lower Long Tom – *high priority to the extent that sources of pollution exist, not because it is where the problem has accumulated*.



Possible Project types:
Prevention to minimize risk to local waterways; reduction in use, especially in urban and rural resident areas where over-application is common; monitoring (in collaboration with USGS or local college); education and outreach concerning proper pesticide application to lawns, native-plant based landscaping, and neighborhood peer pressure discouraging chemically intensive landscaping. See also actions to Restore Riparian Area Function.
It is important to note that these project types are not sufficient to address what may be a significant threat to aquatic health. Monitoring is essential to determine the extent of the problem, especially on the pesticides and toxins present and with known toxicity levels. Possible incoming knowledge: Clackamas Watershed Council's report on local pesticide monitoring program.

Decrease nutrient levels

High nutrient levels encourage excessive algal growth, which deprives the stream of oxygen. This effect can also occur downstream. Council monitoring data show high levels of nitrate and phosphorus in some streams compared to average levels throughout the watershed. The City of Monroe is located within the Southern Willamette Valley Groundwater Management Area and contamination by nitrates is of primary concern.

DEQ Water Quality Limited Streams: *A state standard is not currently set for nutrients so there are no state listings.*

Additional Water Quality Limited Streams for temperature and DO (per Council data):

Bear (P), Coyote (P), Spencer (P), Elk (N), Ferguson (N and P), Lower Amazon (N and P), Lower Long Tom (N and P), Upper Amazon (N and P), Upper Long Tom (N), Fern Ridge Reservoir (P).

Geographic Priorities:
These priorities were set based on severity.

- Lower Amazon, Lower Long Tom, and Upper Amazon sub-watersheds
  High Priority
- Ferguson Creek, Coyote Creek, Bear Creek, sub-watersheds
  Medium Priority – in these areas the situation is less severe but important due to downstream impact.

Possible Project types:
Riparian Area Enhancement (RAE); riparian vegetation planting (RVP); riparian fencing (RF); off-channel watering for livestock (LWO); native shrub and forb filter strips; education and monitoring to reduce or eliminate use of fertilizers; manure management and storage facilities; Conservation Easements or agreements for high-quality areas (RCP); monitoring.

Decrease bacteria levels

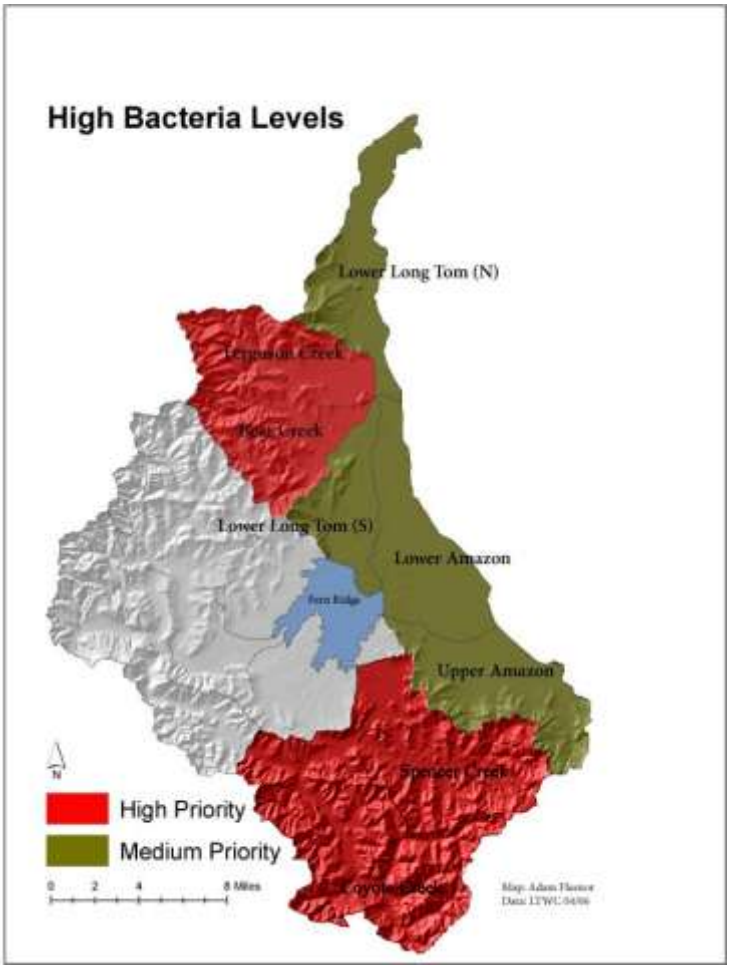
Bacteria is primarily a problem for human health. Excessive levels also imply riparian degradation, nutrient loading and subsequent oxygen depletion of streams, which impacts the vitality of trout. This is often caused from livestock access to streams, and manure.
Note: It is not known how much of a problem the delivery of bacteria from septic sources is. Assessment methods to determine bacteria source are prohibitively expensive and still produce unclear results. Funding for assessment and repair of individual systems is not known to be available. Professional opinion is that domestic livestock are a significant source based on a) the land use patterns in sub-watersheds with high bacteria levels, and b) the bacteria levels at headwater sites that set a probable "background" level for the wildlife contribution.

DEQ Water Quality Limited Streams: lower Long Tom River, Coyote Creek, Fern Ridge Reservoir, Amazon Creek, Amazon Diversion.

Additional Water Quality Limited Streams (per Council data): Bear Creek, Ferguson Creek, Spencer Creek.

Geographic Priorities based on Council *E. coli* monitoring data:
Viewing high bacteria as an indicator of riparian degradation, high priority areas affect both humans and fish.

- Bear, Ferguson, Coyote, and Spencer sub-watersheds
  High Priority
- Upper Amazon Creek sub-watershed; Fern Ridge Reservoir (human health issue; probable sources include inflow from Coyote and Amazon Creeks, and septic); Lower Amazon Creek sub-watershed (seasonal issue; probable sources include sheep, nutria, Upper Amazon inflow); Lower Long Tom River sub-watershed (probable sources are upstream, some domestic livestock)
  Medium Priority



Possible Project types:
Manure management and storage facilities; riparian fencing (RF); off-channel watering for livestock (LWO); Riparian Area Enhancement (RAE); riparian vegetation planting (RVP); native shrub and forb filter strips; Conservation Easements or agreements for high-quality areas (RCP); monitoring.

Correct sediment supply

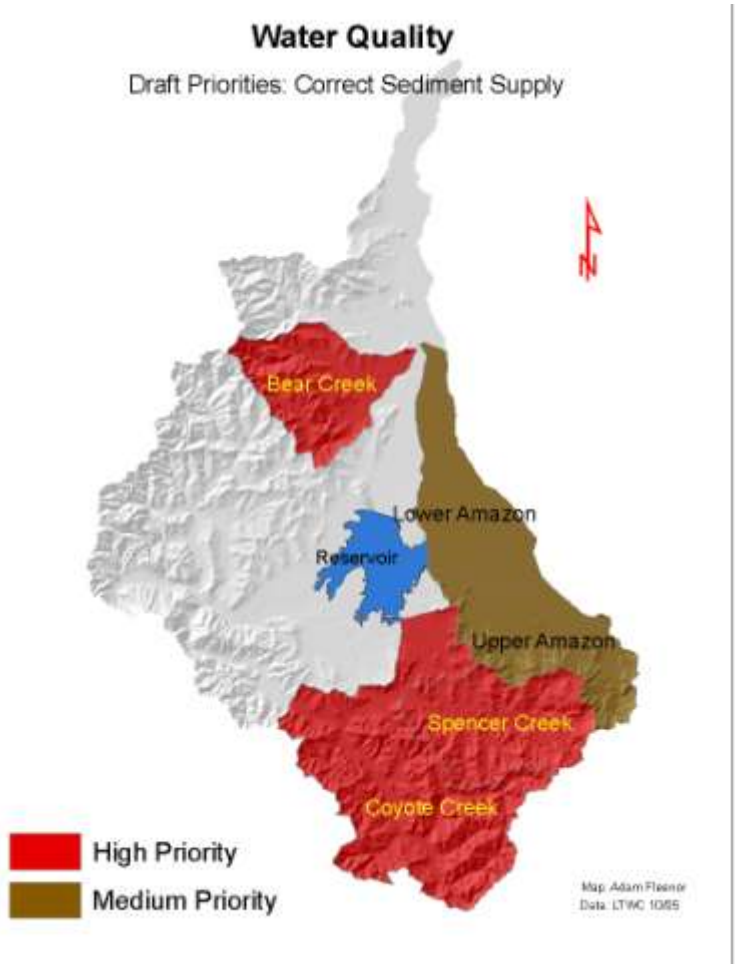
High sediment levels impair aquatic life in respiration, visible feeding, and by clogging spawning gravels. Duration is a significant factor as this watershed experiences chronic turbidity levels. Projects and management changes should aim to correct sediment supply to a more natural amount, variation and timing.

DEQ Water Quality Limited Streams: Fern Ridge Reservoir

Additional Water Quality Limited Streams (per Council data): lower Long Tom River (turbidity)

Geographic Priorities:
Note: these may be reordered upon secondary review based on sediment as a limiting factor versus where the worst problems exist.

- Bear Creek Sub-watershed, Coyote Creek Sub-watershed, Spencer Creek Sub-watershed
  High Priority
- Upper Amazon Sub-watershed, Lower Amazon Sub-watershed
  Medium Priority
- Lower Long Tom Sub-watershed and Fern Ridge Reservoir itself
  Although a significant problem, any correction here is unlikely due to the configuration and depth of Fern Ridge Reservoir, and the amount of sediment it contributes to the lower river.



Possible Project types:
Limit/prevent sediment delivery from road/stream intersections or proximity; Channel and Bank Alteration (CBA); streamside terracing and bank sloping (BS); water/sediment control basins (WSCB); updating practices in ditch maintenance, fallow fields, tree farms, construction sites; Riparian Area Enhancement (RAE); riparian vegetation planting (RVP); riparian fencing (RF); off-channel watering for livestock (LWO); native shrub and forb filter strips; Conservation Easements or agreements for high-quality areas (RCP); monitoring.

TERRESTRIAL

Five key habitat types in the watershed have been significantly reduced or modified from historic levels in a way that severely limits the distribution of native fish and wildlife. These are: upland prairie and oak savanna, wet prairie, dry conifer and hardwood forest, perennial ponds and backwaters, and riparian areas.

> *"The Long Tom Watershed is the anchor area for Willamette basin terrestrial species in upland prairie, oak savannah, and wet prairie habitats – it should be the geographic focus as we will not be able to recover listed species without it."*
>
> - *Steve Smith, USFWS, February 2005.*

Ecological Goals: Sufficient acres of threatened habitat types (especially oak savanna, upland prairie, and bottomland hardwood forests) to support viable populations of species dependent on these habitats, and an absence of invasive non-native species. Sufficient acreage and variety of wetlands to support stream hydrologic functions and viable populations of native wetland dependent species, and an absence of invasive non-native species. Appropriate management of conifer or mixed-conifer forested landscapes to support viable wildlife populations dependent on these habitats and an absence of invasive non-native species.

Upland prairie & Oak savannah

Typical species: elk, Colombian black-tailed deer, American kestrel, western meadowlark, horned lark, vesper sparrow, western rattlesnake, gophersnake, racer, western pond turtle (nesting), Taylor's checkerspot, Fender's blue butterfly, Kincaid's lupine, Nelson's checkermallow, golden paintbrush, Roemer's bunchgrass, blue wildrye, California oatgrass, Hitchcock's blue-eyed grass, white-topped aster, pale larkspur, peacock larkspur, shaggy horkelia

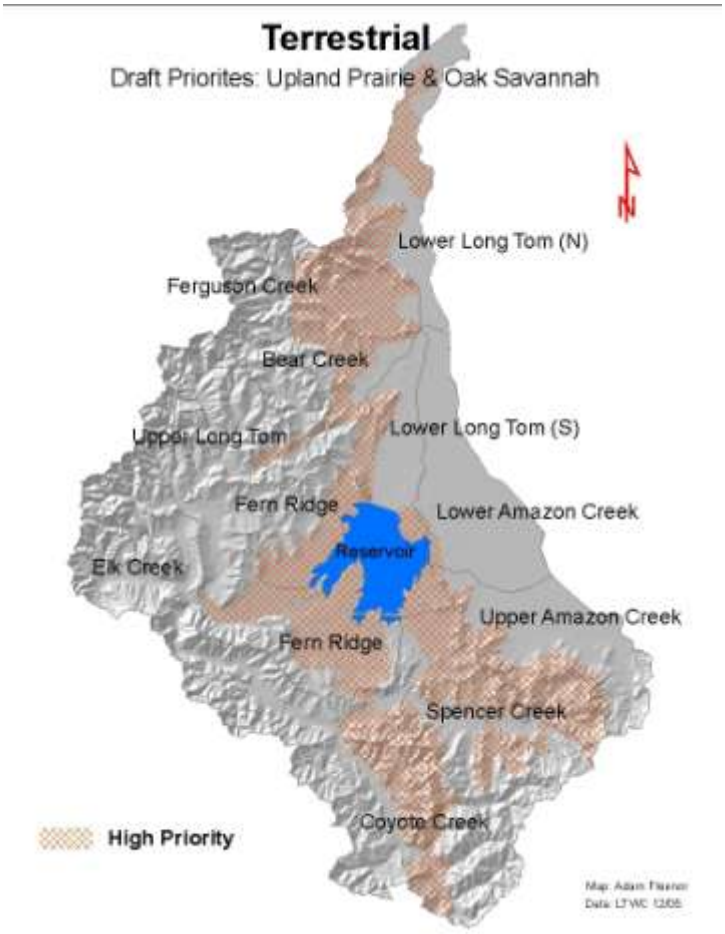
Status and Priority:
Upland prairie and oak savannah are the rarest habitat types in the Long Tom Watershed and the entire Willamette Valley. Historically they covered a significant portion of the watershed. Their loss is mainly due to conversion to urban and agricultural land, and fire suppression which has allowed shrubs, trees, and non-native invasive species to colonize these sites. Upland prairie provides habitat to a number of sensitive or threatened plant and animal species.

This habitat is a top priority because of the number of listed species, the extent to which the habitat has been altered and eliminated, and the limited dispersal ability of the Fender's blue butterfly. The West Eugene Wetlands and prairies in the southeast portion of the Long Tom Watershed are the anchor for this habitat in the entire Willamette Valley.

Limiting factors for this habitat type[4]: Land use conversion and continued habitat loss. Fire suppression and fir encroachment. Invasive species. Land management conflicts. Loss of habitat connectivity. Loss of habitat complexity.

Geographic Priorities:
Please also refer to the associated map for this habitat.
High Priority:

- Spencer Creek, Fern Ridge south, parts of Coyote, lower end of Upper Long Tom, areas east of Fern Ridge Reservoir up to City of Eugene UGB. *Habitat in these sub-watersheds is the best of what's left in condition and extent.*
- Bear Creek, Ferguson Creek, Lower Long Tom
  These sub-watersheds contain habitat needed to expand northward the range of prairie/savannah-dependent species. This is needed to link habitats for species' dispersal and to promote interchange with other populations for genetic diversity.
- Within the priority areas, TNC portfolio sites are specific known opportunities.



Considerations for prioritization*:*
This habitat type is fragmented and thus restoration should 1) expand the functionality of existing habitat by restoring areas of adjacent habitats and 2) connect existing concentrations or patches. Measures are most helpful on sites with concentrations of existing at-risk species, sites designated critical habitat, or sites identified in a Recovery Plan. This habitat is vulnerable to land-use changes - to provide for the long-term security of this habitat the long-term potential for monitoring, maintenance, and management should be taken into account.

Possible Project Types:
Vegetation Management (VM): reduce and control invasives (ISM), controlled burning (CB) [5], conifer thinning (CT), thinning to create savannah conditions; planting and re-vegetation, reintroduce native forbs and especially nectar plants, planting oaks; upland bird management practices for agriculturally productive lands; monitoring.

Wet Prairie/Emergent Marsh

Typical species: common yellowthroat, common snipe, northern harrier, sora, American acetropis grass bug, western toad, water howellia, Bradshaw's lomatium, Nelson's checkermallow, Willamette Valley daisy, white-topped aster, shaggy horkelia, peacock larkspur, tufted hairgrass, common camas

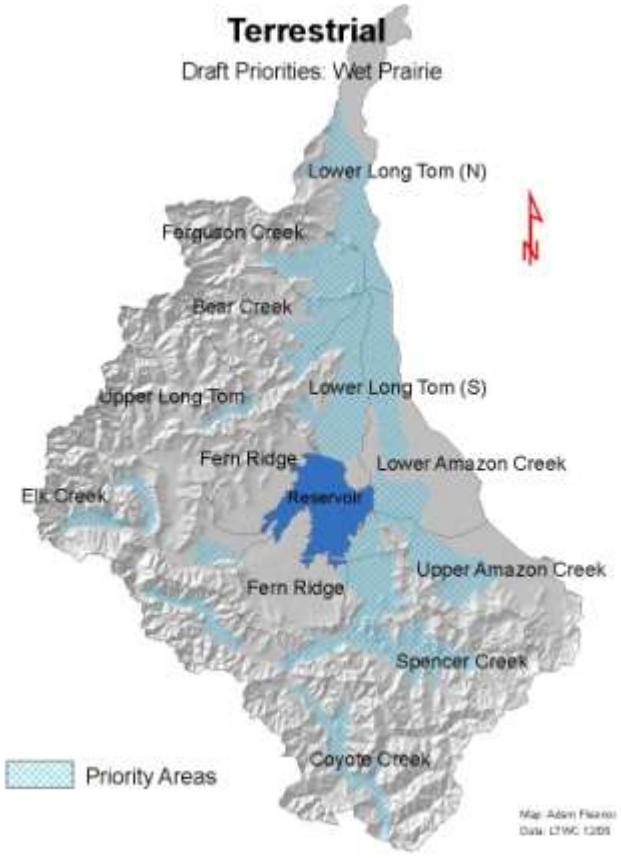
Status and Priority:
Wetland prairie historically covered an estimated 34,500 acres in the Long Tom Watershed. Over the past 150 years these wetlands have been converted and filled, overgrown by wetland trees and shrubs due to fire suppression, or altered to other wetland types. Today there are approximately 1,000 acres, several hundred of which are in the West Eugene Wetlands. Significantly, the acreage in the southeast portion Long Tom probably represents more than half of what exists in the entire Willamette Valley today. This network of sites provides an important hub for restoring a connected matrix of wet prairie. This habitat is a top priority due to the listed plants and candidate-listed wildlife species it hosts and because of the degree to which the habitat has been reduced and altered compared to the historic extent.

Limiting factors for this habitat type: Habitat loss. Water availability. Degraded water quality. Invasive species. Altered fire regimes. Land management conflicts. Loss of habitat connectivity and complexity.

Geographic Priorities:
Please also refer to the associated map for this habitat.

- High priority areas are those within the 100-year floodplain and/or with hydric soils, combined with those in low fertility/capability class.
- High priority areas are those shown highlighted on map
- Medium priority areas are those not highlighted on map

Considerations for prioritization*:*
Other factors for prioritization include the size of the parcel, adjacency and connectivity with other high quality habitats, and sites with the presence or proximity of at-risk species. This habitat type is fragmented and thus restoration should 1)



expand the functionality of existing habitat by restoring areas of adjacent habitats and 2) connect existing concentrations or patches. Measures are most helpful on sites with concentrations of existing at-risk species, sites designated critical habitat, or sites identified in a Recovery Plan. This habitat is vulnerable to land-use changes - to provide for the long-term security of this habitat the long-term potential for monitoring, maintenance, and management should be taken into account.

Possible Project Types:
Wetland enhancement (WE); excavation/removal of fill (ERF); elimination of drainage structures (EDS); invasive species removal; native vegetation planting; woody species removal; controlled burning (CB); monitoring.

Riparian/Oxbow/Backwater Slough

Riparian Typical species: bald eagle, willow flycatcher, green heron, yellow warbler, swallow, dusky-footed woodrat.
Other Typical species: red-legged frog, western pond turtle, purple martin, wood duck, American beaver, river otter.

Status and Priority:
Significant limiting conditions to proper riparian zone function in the watershed include loss of large conifers in the upper reaches, loss of bottomland hardwood forest, replacement of trees and native shrubs with invasive species, grasses, or bare soil, and an overall reduction in the density and number of trees in riparian areas. In some cases, the loss of function is due to a streamside wetland or prairie area being overgrown by forest. Almost 60% of riparian areas have moderate to high loss of ecological function due to one or more of these causes. Many species depend wholly or in part on riparian habitat and have been negatively affected by this loss in function. In addition, loss of shade contributes to warmer stream temperatures, which has had a significant impact on cutthroat trout.

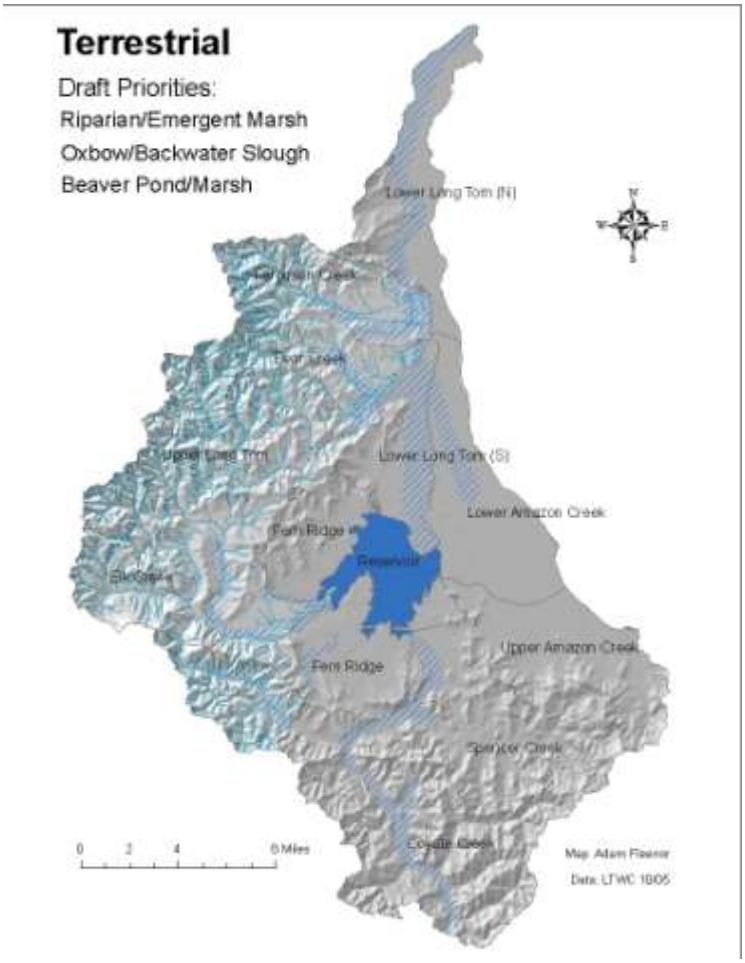
Perennial oxbow ponds and slow-moving backwaters were much more common in the watershed then they are today. Many of these oxbows were filled in to make way for farming, and the meandering paths of lowland streams were straightened to provide quicker evacuation of high flows. These development patterns have reduced habitat for Oregon chub (historically present in the watershed), western pond turtle, and red-legged frog, among other species.

Both these habitats are a priority due to neo-tropical migrants, amphibians, and the western pond turtle. Restoration conducted here will also address fish and water quality needs. Riparian areas are a priority throughout the watershed, especially in third-order and larger streams because this is when the hydrology creates a distinctive vegetation component and affects the tree canopy.

Limiting factors for this habitat type: Loss of riparian habitat, floodplain function, and habitat complexity. Habitat degradation. Loss of habitat conductivity. Invasive plants.

Geographic Priorities:

Please also refer to the associated map for this habitat.
These habitats are a priority in all areas of the watershed;



Known opportunities exist in:

- Coyote and Upper Long Tom floodplain areas
- Lower Long Tom, lower reaches of Bear and Ferguson, Lower Amazon
  This links the Long Tom and Willamette Rivers for key aquatic species (migratory fish, pond turtles, chub)
- Fern Ridge wildlife area, Veneta complex, and the lower basins around the southern end of the reservoir.
- Poodle Creek (in Elk Creek) and other areas

Considerations for prioritization*:*

- Third-order and larger streams
- The larger the site the better
- Presence or proximity of at-risk species
- Potential wildlife response
- A small area of habitat in a disturbed area may be just as valuable to nearby individual animals as a large contiguous block is to sustain populations.
- Seasonal streams can be just as important as perennial if they have rare or unusual species (e.g. Willow Creek within Amazon sub-watershed).

Possible Project Types:
See project types for Aquatic – Water Quality – Restore Riparian Area Function

Dry Conifer/Hardwood Forest

Typical species: acorn woodpecker, chipping sparrow, western wood peewee, white-breasted nuthatch, Northern spotted owl, southern alligator lizard, sharptailed snake, Western gray squirrel, red-legged frog, wayside aster

Status and Priority:
Dry Conifer/Hardwood forest includes two types - Woodland/Shrubland, characterized by scattered conifer or scattered oak and conifer with a significant native shrub component and a

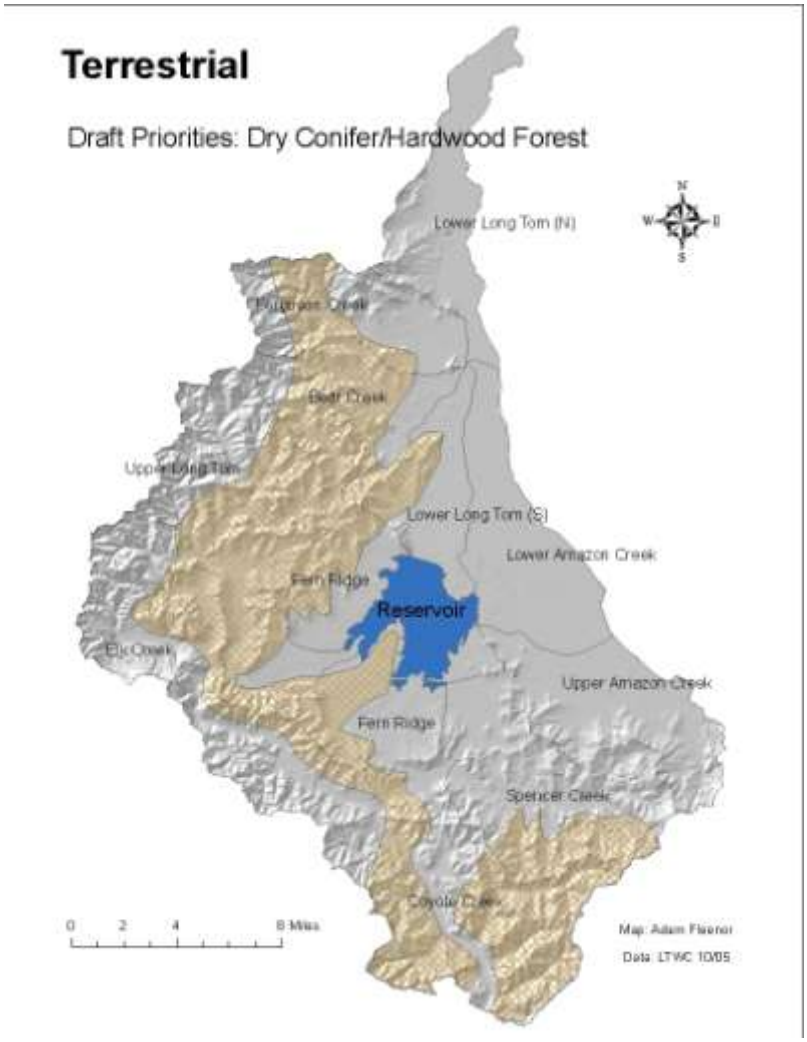
sparse canopy, and <u>Closed Forest</u> characterized by conifer (ponderosa pine and incense cedar) and broad leaf evergreens (madrone and chinquapin) and some oak.

Historically, both of these forest types were widespread in the watershed, covering much of the Coast Range foothills. A significant amount of this habitat has been lost by conversion to forestry or agriculture, or invasion of Douglas fir, which is most likely due to fire suppression. Dry conifer and hardwood forests provide habitat for a particularly diverse assemblage of species, and restoration is a priority due to the large number of species that depend on it.

<u>Limiting factors for this habitat type</u>: Land use conversion and continued habitat loss. Altered fire regimes and addressing risk of uncharacteristically severe wildfire. Fir encroachment. Invasive species. Land management conflicts. Loss of habitat connectivity. Loss of habitat complexity.

Geographic Priorities:
Please also refer to the associated map for this habitat.

- Between approximately 500' and 1,000' elevation zone of the southern and western Coast Range foothills surrounding the watershed.
- Within the priority areas, TNC portfolio sites are specific known opportunities.



Considerations for prioritization*:*

- Other factors for prioritization include the size of the parcel, adjacency and connectivity with other high quality habitats, and sites with the presence or proximity of at-risk species.
- This habitat type is fragmented and thus restoration should 1) expand the functionality of existing habitat by restoring areas of adjacent habitats and 2) connect existing concentrations or patches. Measures are most helpful on sites with concentrations of existing at-risk species, sites designated critical habitat, or sites identified in a Recovery Plan. This habitat is vulnerable to land-use changes - to provide for the long-term security of this habitat

the long-term potential for monitoring, maintenance, and management should be taken into account.

Possible Project Types:
Vegetation Management (VM): Similar to those for Upland Prairie & Oak Savannah habitat, but especially: limit conifer invasion; thin trees; plant for species diversity based on what site historically supported; controlled burning (CB). Include specific habitat requirement of rock outcrops for the southern alligator lizard; monitoring.

Old Growth Forest

Typical species: pileated woodpecker, olive-sided flycatcher, Vaux's swift, marbled murrelet, Northern spotted owl, great gray owl, Oregon slender salamander, American marten, red tree vole, Townsend's big-eared bat, red-legged frog.

Status and Priority:
This habitat is less of a priority as it is already somewhat protected and managed for habitat values by BLM, ODF, and there is not a significant amount in the Long Tom Watershed relative to other basins.

Limiting factors for this habitat type: Loss of some structural habitat elements. Loss of late-successional stand size and connectivity. Altered fire regimes.

Geographic Priorities:
- BLM Late Successional Reserves, state-owned lands, and forest areas adjacent to those or adjacent to other projects.

Possible Project Types:
Old-growth conifer forest conservation.

Notes and References

Notes

1. *"At-risk" species are those listed with some kind of concern for their status in the Natural Heritage Info. Center database. There is a specific list for the Long Tom River watershed. Each species is evaluated regarding their population and breeding population status and ranked in relation to their statewide, federal and global situations, as applicable.*
2. *For more information pertaining to species-specific conservation measures see the Oregon Department of Fish and Wildlife Service publication, "Draft Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington" available on the web*.
3. *Project types will be further prioritized based on potential success at a given site.*
4. *Limiting factors for terrestrial habitat types are taken from Oregon Conservation Strategy (ODFW 2006).*
5. *At this point controlled burning and land acquisition are two project types the Council will not undertake.*

References for Aquatic Priorities

- *Long Tom Watershed Assessment* 2000, Long Tom Watershed Council
- *Long Tom River Water Quality Report 1998-2003,* Long Tom Watershed Council
- Gary Galovich, Biologist, ODFW, Personal Communication, Feb., Oct., Dec. 2005.
- LTWC Technical Team, Pers.Comm., November and December 2005.

Other references were reviewed to develop the understanding of staff and technical team during the development of these priorities such as the Draft Willamette Basin Sub-basin Plan (NWPCC, 2004) and Willamette TMDL (DEQ, 2004), USGS Willamette River Water Quality Report (2000, pp. 20-21). Still to be reviewed and incorporated: LTWC Stream Health and Water Quality Report 2007.

References for Terrestrial Priorities

- *Long Tom Watershed Assessment* 2000 Long Tom Watershed Council
- Steve Smith, Biologist, USFWS, Personal Communication, February 2005.
- Kat Beal, Biologist, US Army Corps of Engineers, Pers. Comm., Oct., Nov. 2005.
- Ed Alverson, The Nature Conservancy, Pers. Comm., Nov., Dec. 2005.
- LTWC Technical Team, Pers.Comm., November and December 2005.

Other references were reviewed to develop the understanding of staff and technical team during the development of these priorities, and to support a limited update of them in 2009 before web publication, such as the Draft Willamette Basin Sub-basin Plan (NWPCC, 2004) and The Nature Conservancy's habitat priorities for the Willamette Basin/Puget Sound Trough (2004), the Oregon Department of Fish and Wildlife's Oregon Conservation Strategy (2006), and the USFWS Draft Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington (2008).

Approach and criteria to identify and prioritize restoration efforts

Overall Strategy

When determining the overall strategy for conservation, the Council considers the following sequence of activities, (adapted from Roni, et al.):

1) **CONSERVE: Maintain and protect** in places where there is sufficient to high quality function currently. *Note: The Council does not take the lead in implementing this project type. The Council collaborates with partners in their prioritization of conservation areas, then discusses conservation (i.e. protection) with landowners where appropriate and refers that specific action to partners for implementation.*
2) **RESTORE: Reconnect** high quality, functioning habitats to each other (this especially applies when considering fish passage or upland species population viability)
3) **RESTORE: Restore processes and functions** that will passively restore habitat, and do so for the long-term
4) **RESTORE: Restore or enhance habitat** at specific sites

Identifying and Prioritizing Restoration Efforts

The Council uses the following steps to prioritize geographic areas, habitat emphasis, project types, and projects:

Step	Based on	Result
Identify priority areas and habitats for conservation and restoration	Ecological data; professional judgment; existing plans	Selected sub-watersheds or areas, and habitat emphasis
Identify potential project areas	Strategic location; potential landowner interest	A set of potential project sites within key areas with landowners willing to collaborate in restoration
Determine restoration potential and likelihood of effect	Considerations such as geomorphology, hydrology, habitat condition, surrounding influences	Refined set of potential sites and project types applicable
Move from possible sites to developing projects for implementation	Considerations such as landowner interest, funds, time constraints, permits	Final selection of projects

Evaluating Individual Projects

The Council uses the following principles to evaluate potential projects: 1) Meets Priorities, 2) Acres or stream length affected and benefit to multiple species possible, 3) Proximity of project to high quality habitat or restored land, 4) Likelihood of restoration success in improving habitat and function, 4) Level of landowner interest and capability to implement and steward project, 5) Funding potential, 6) Partnership opportunities, 7) Community support, especially in terms of interest from other potential project landowners, and/or lack of controversy, especially with neighbors, 8) Potential for long-term protection of habitat or function, 9) Surrounding threats to project success or longevity, such as from land-use, and 10) Council is most appropriate entity.

Initial Monitoring Concepts

Watershed or Sub-watershed Scale Monitoring: Every 5 – 10 years

1) Develop measurable objectives for target water quality and habitat indicators. These could be either numeric or trend and should be realistic.
    a. Water temperature (key sub-watersheds that have modeling results available like Coyote Creek, Ferguson Creek, maybe Bear Creek)
    b. Bacteria (Ferguson Cr., Bear Cr.) (decrease average levels)
    c. Nitrates (Sub-watersheds that we have documented increasing trends in) (decreasing trend or decreased average levels)
    d. Turbidity (Upstream-downstream differences; objective could be to decrease average difference compared to what they are now)
    e. Riparian zone conditions (randomly selected sites- could be macroinvertebrate sites- look at differences over time; Are riparian areas getting narrower/sparser; wider/denser; more shade/less shade?
    f. Macroinvertebrate conditions (select a sub-set of subwatersheds)- Improve scores compared to 2003-06 scores; go back to a sub-set of the same sites.

2) Target actions in certain sub-watersheds for E. coli reduction, temperature reduction, riparian enhancement, and nitrate reduction. Use measurable objectives above to assess impact. *Sub-watersheds: Coyote Creek, Bear Creek, Ferguson Creek.*

3) Assess land use changes
    a. Forest harvest acreages (from ODF annual data)
    b. Agriculture crop acreages (from FSA annual data)
    c. Percent impervious surface increase (from LCOG or City of Eugene?)

4) Partner with the Nature Conservancy on Conservation Action Plan monitoring for Spencer, Coyote, and Amazon Creek sub-watersheds. TNC and other partners will assess effectiveness of restoration and conservation actions on oak woodland, oak savanna, upland prairie, and wet prairie.

Restoration effectiveness monitoring: select project types

Specific parameters are to be determined with emphasis on site-specific monitoring techniques, and utilizing data provided by fellow organizations and/or similar or related projects to determine technique effectiveness and inform restoration opportunities and priorities.

1) Riparian enhancement projects
    a. Shade increase (densitometer)
    b. Temperature decrease (summer continuous temperature monitoring)
2) Large wood and other instream enhancement projects
    a. Stream surveys (thalweg profile, wood county, Wolman pebble count)
3) Habitat projects
    a. Amphibian, bird utilization and/or response.

Appendix A
Ecological Goals

Approved by Steering Committee, Tech Team, Council, OWEB. 2004.

Aquatic passage

Goal: Unrestricted passage for a variety of aquatic species to stream reaches that include breeding and rearing habitat and summer and winter refuge. Note: this excludes natural barriers.

Instream Habitat

Goal: Streams with sufficient channel complexity to support native fish and other aquatic species.

Water Quality

Goal: Water quality and quantity conditions, including groundwater, that support viable populations of native aquatic life.

Riparian Zones

Goal: Riparian zones that provide a high degree of ecological function with an absence of invasive non-native species.

Wetland habitat

Goal: Sufficient acreage and variety of wetlands to support stream hydrologic functions and viable populations of native wetland dependent species, and an absence of invasive non-native species.

Upland habitat

Goal: Sufficient acres of threatened habitat types (especially oak savanna, upland prairie, and bottomland hardwood forests) to support viable populations of species dependent on these habitats, and an absence of invasive non-native species.

Goal: Appropriate management of conifer or mixed-conifer forested landscapes to support viable wildlife populations dependent on these habitats and an absence of invasive non-native species.

Hydrology

Goal: Streams that exhibit a natural hydrologic regime, such that they interact with their floodplains to reduce peak flows, increase base summertime flows, exchange nutrients, promote groundwater recharge, and provide off-channel habitat.

Sediment Supply

Goal: Sediment delivery to streams that is within natural range of variation in both timing, character, and amount so that no adverse effects occur to native aquatic organisms.