Shoreline Inventory and Assessment for Spokane County Lakes

1.0 INTRODUCTION

The purpose of this assessment was to provide management and policy guidance for the shoreline resources within the County of Spokane. This document, when used with other planning information, will assist Spokane County in the update of the Shoreline Program, as well as provide an inventory and understanding of the shoreline functions and values for 47 lakes within Spokane County.

The Shoreline Management Act of 1971 was passed by the Washington State Legislature and ratified by the people of Washington State in November 1972. Passage of the Shoreline Management Act was based on the loss of shoreline resources to development, the increasing number of problems associated with the use, misuse of shorelines, and to provide for the management of the shorelines of Washington State.

“The Shoreline Inventory and Assessment has been developed to serve as a guide to those local officials charged with the duty of administering and updating the Spokane County Shoreline Program as required by the Shoreline Management Act (Chapter 90.58 RCW). This shoreline inventory and assessment for lakes in Spokane County will also assist in providing management and policy guidance to meet the requirements of Chapter 36.704.040 RCW for designation and protection of critical areas” (Critical Shoreline Habitat Identification). The Shoreline Inventory and Assessment will also be the basis for updating the County Critical Areas Ordinance to protect wildlife habitat associated with lake shorelines.

1.1 Background

Spokane County and the area immediately to the west and south lies within the Palouse Subprovince of the Columbia River Plateau Physiographic Province. The Columbia River Plateau is largely characterized by massive Miocene–age (17 to 6 million years ago) flood basalts. Spokane County is situated on the eastern edge of this basalt plateau where the basalt flows encroached on the edge of the existing bedrock highlands. The higher hills and mountains in the Spokane area such as Mount Spokane, Browne Mountain, and Mica Peak represent existing topographic highs on the pre-basalt surface. The pre-basalt geology is comprised of weakly to moderately metamorphosed Precambrian sediments intruded by coarse-grained Mesozoic-aged intrusive rocks.
The basement rocks in the region are comprised of Wanapum Formation basalts. This basalt is commonly interbedded with sedimentary clay and silt units collectively known as the Latah Formation. The upper basalt flow surface, commonly exposed in outcrops and cliffs in the study area, is vesicular, deeply fractured, and highly weathered in places.

The surficial landforms of Spokane County, including valleys, cliffs, and lakes, are the result of a series of catastrophic floods of enormous volume which flowed across the eastern edge of the Columbia Plateau. More than 40 of these floods resulted from periodic breakage of ice dams that impounded glacial Lake Missoula, situated in northern Idaho and western Montana, during the period between 15,300 and 12,700 years before the present (Waitt, 1985). The repeated flood events deposited abundant interbedded sand, gravel, and boulder layers collectively referred to as the Spokane Flood deposits. Coarse sediments were deposited during the early recession of floodwaters, followed by finer sediments during the latter stages of floodwater recession.

However, in western Spokane County, the repeated floods commonly eroded much or all surficial sediments, causing numerous areas of shallow scour which resulted in the creation of relatively shallow basins in the basalt and glacial sediments, as well as the creation of deep channels into the basalt bedrock, many of which are still visible west of Spokane (Bretz, 1969).

Lakes in Spokane County are present in three general areas: in alluvial deposits, such as Liberty or Newman Lakes; in relatively shallow scour basins, such as Medical or Clear Lakes; and in the deeper channels in the basalt, such as Bonnie or Fishtrap Lakes. Although much overlap in physiography is present between these general types, lakes in each of these environments exhibit unique and distinguishing characteristics found only in this area of Washington State.
2.0 BEST AVAILABLE SCIENCE GUIDANCE

Spokane County, using best available science has categorized shoreline areas. The system provides a uniform basis for applying policies and use-regulations in differing shoreline areas. The management designation, given specific areas, is based on the existing development pattern, the biophysical capabilities and limitations of the shoreline area to be considered for development, and the goals and aspirations of local citizenry of Spokane County.

The best available science process consists of research conducted by qualified individuals using documented methodologies that lead to verifiable results and conclusion. The Washington State Office of Community Development (OCD) adopted administrative rule guidance in August 2000 (Chapters 365-195-900 through 925 WAC) for determining what is best available science and where to obtain it. In the context of shoreline programs and critical areas ordinance update, a valid scientific process is one that:

- Produces reliable information useful in understanding the consequences of a local government’s regulatory decisions.
- Incorporates best available science guidance to assess current attributes and processes, site capability and potential, non-point pollution potential, and functional condition of shorelines.
- Identifies and ranks shoreline critical areas based on non-point pollution reduction and restoration and/or re-vegetation potential as well as protection from these areas that are considered sensitive to development.

Appendix B lists the references that were used for this assessment. Section 2.3 discusses specific methodology in context with the listed references.

2.1 Existing Spokane County Shoreline Management Area Designations

The current Spokane County shoreline classification system has classified shorelines into five distinct management areas (Natural, Pastoral, Conservancy, Rural, and Urban) providing the framework for implementing shoreline policies and regulatory measures. Below are the current designation categories. Following those categories are questions that the analysis team used to evaluate shoreline current designations and the need for updating that designation.
The Natural Area Designation
The Natural Area is intended to preserve, maintain, or restore those natural resource systems existing relatively free from human activities, and those shoreline areas possessing natural characteristics intolerant of human use or of historical and cultural significance.

- Within this category are the resource systems still relatively free from human activities?
- What is the status and implications of development on those natural characteristics?
- Does current land use and ownership lend itself to this designation in the future?

The Pastoral Area Designation
The Pastoral Area is intended to protect and maintain those shorelines, which have historically been subject to limited human interference and have preserved their natural quality as wildlife habitat and places of scenic beauty.

- Are these natural qualities still intact?
- What has been the implication of development on these attributes?
- What are the areas current ecological values and does land use and ownership allow for retention of those values?

The Conservancy Area Designation
The Conservancy Area is designated in Spokane County for the purpose of maintaining the existing character of shoreline resources while providing for nonintensive uses.

- Can the current conditions still be considered nonintensive use?
- Singularity and cumulatively, has development based on ownership lines and land use changed the past nonintensive nature of the ecological systems?

The Rural Designation
The Rural Area is presently used for agricultural, recreational and low-density suburban types of development, and/or has the potential of becoming prime farmland.

- Is the current condition still low density suburban types of development or agricultural?
- Singularity and cumulatively, has land use and ownership changes moved the area away from low density to more urban use?
The Urban Area Designation

The Urban Area designation is intended to accommodate compatible water-dependent and water-oriented uses in shoreline areas.

- Is the current condition still indicative of the shorelines?
- Are uses still consistent with shoreline setbacks and water quality needs?

Using these designations, the interdisciplinary team established current baseline condition and site capability and potential and compared this data with past designations. With this information and the PFC assessment process, the team developed an overall lake prioritization process based on the need for restoration, maintenance, and preservation. In addition, each lake was individually assessed and ranked on the basis of non-point pollution reduction potential, restoration and/or vegetation needs, and protection or sensitivity to development. This information is mapped and tabulated specific to each individual lake and shorelines within those lakes in Section 3.0 for the overall lake prioritization and in Section 4.0 for the individual shorelines within each lake.

2.2 Proper Functioning Condition Assessment

The Bureau of Land Management (BLM), in conjunction with the United States Forest Service (USFS) and Natural Resource Conservation Service (NRCS), has developed guidelines and procedures to rapidly assess whether a riparian area is functioning properly in terms of its hydrology, landform/soils, channel characteristics, and vegetation (Prichard et al. 1993, rev. 1995). This assessment is useful as a baseline analysis of stream, wetlands, and lakes condition and physical functions. It can also be used to assist in larger scale watershed analysis.

Proper Functioning Condition (PFC) is a methodology for assessing the physical functioning of riparian-wetland area and lake shorelines. It provides information critical to determining the “health” of a riparian ecosystem. PFC considers both abiotic and biotic components as they relate to the physical function of riparian areas, but it does not consider the biotic components as it relates to habitat requirements. For habitat analysis, other techniques must be employed.

With the results of PFC analysis, it is possible to begin to determine shoreline and watershed restoration needs and priorities as well as changes from past shoreline category designations. PFC results may also be used to identify where gathering more detailed information is needed and where additional data are not needed.
Identifying lake shorelines where riparian areas are not in proper functioning condition, and those at risk of losing function, is the first step in prioritizing areas for restoration analysis and protection or sensitivity to development impacts. Physical conditions in riparian zones are excellent indicators of what is happening in a given water body.

The following are definitions of proper function as set forth in Technical Report #1737-9:

**Proper Functioning Condition**—Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:

1. Dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality.
2. Filter sediment, capture bedload, and aid floodplain development.
3. Improve floodwater retention and groundwater storage.
4. Develop root masses that stabilize streambanks against cutting action.
5. Develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses.

**Functional-at-Risk**—Riparian-wetland areas that are in a functional condition but existing soil, water, or vegetation attributes can make them susceptible to degradation.

**Nonfunctional**—Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large debris to dissipate stream energy associated with high flow and thus are not reducing erosion, improving water quality, or performing other functions as listed above under the definition of proper function. The absence of certain physical attributes, such as absence of a floodplain where one should be, is an indicator of nonfunctioning conditions.

Assessing functionality with the PFC technique involves procedures for determining a riparian-wetland area’s capability and potential, and comparing that potential with current conditions. This process will assist Spokane County Planning in the update and prioritization of the shorelines of the 47 County Lakes.
2.3 Specific Methodology

The analysis team, working with the Spokane County Staff and coordinating with resource agencies including the Washington State Departments of Ecology and Fish and Wildlife, identified "best available science" references to meet the assessment goals of identifying lake shore characteristics and attributes as well as functional condition and rating.

Assessment for shoreline and wetland characteristics, attributes, capability, potential as well as functional assessment was completed using PFC, a qualitative assessment developed by the Bureau of Land Management. This process was used to examine the lake shorelines (lentic systems) throughout Spokane County. An overall functional rating based on the condition of the lake and wetland complexes was assigned as well as individual shoreline ratings within each system. Geographic Information Systems (GIS) technology was used to map the lakes of Spokane County and attribute the specific spatial characteristics and process of each lake. This information was used with the PFC assessment to examine the potential of each of the individual lakes as well as the validity of specific shoreline delineations within each system.

The analysis team consisting of a vegetation specialist, wetlands biologist, land use planner, hydrogeologist, environmental scientist, and wildlife biologist used best available science guidance and existing data to assess each of the lake shorelines. This information consisted of:

- Spokane County Shoreline GIS maps
  - Individual Orthophoto Quads
  - Comprehensive Plan and Shoreline Designation Maps
  - Spokane County Shoreline Update Maps
  - PHS/Wetlands/Contour Maps
  - Spokane County Soils Map
  - University of Washington Vegetation Maps
  - Ownership and Plat maps
- Literature Search (Appendix B)
- Site Visit and Field review
- Examination of photos and orthophoto quads.
- Use of the PFC Assessment for Lentic Areas inventory process and functional rating system.
- Interdisciplinary review
This information was used to prioritize the following individual shoreline assessment criteria to assist the County in assessing shoreline designations and whether or not existing designations should be revised. The criteria were:

- Non-point source pollution potential
- Potential ecological need for restoration
- Ecological sensitivity to development
- PFC rating.

**Non-Point Source Pollution Potential**

Potential for non-point source pollution was rated as low, moderate, or high for each of the delineated shorelines based on the degree of negative effect on down-gradient streams and the potential for effecting ecologically sensitive areas that are still intact within the individual lake boundaries. A low rating indicates negligible or no effect on down-gradient streams and a high capability of the system to dissipate the non-point pollution source through natural functioning processes (wetlands). A moderate rating indicates a low degree of negative effects on down-gradient streams and moderate capability of the system to dissipate the non-point source. Overtime these moderate rated systems characterized as having a downward trend are not likely to be able to cycle these pollution sources, particularly if the sources have not been ameliorated or are allowed to continue in the current trend. A high rating indicates a high potential for negative effects on down-gradient streams and a low or no capability to dissipate the non-point source.

**Ecological Need for Restoration**

Potential for restoration was rated as low, moderate, or high for each of the delineated shorelines based on the current habitat conditions and/or the opportunity to re-establish near natural conditions. A low rating indicates a near natural condition that is stable and restoration is a low priority. These areas would be areas more in need of retention or preservation. A low rating in areas of high development indicates a change in land use that cannot be easily reversed (development of residential, recreational, or industrial complexes). A moderate rating indicates a near natural condition that is potentially unstable and subject to peripheral changes that will overtime negate potential for restoration. A high rating for restoration indicates a habitat condition that has been altered from natural but has the potential to be restored. Considerations for high restoration potential were areas with minimal development or development that had been consistent with existing designations and no multiple ownership restrictions. Although some of these areas may not be easily restored they
possess the highest potential for restoration in areas where future development may exclude the potential for restoration.

**Ecological Sensitivity to Development**

Sensitivity to development ratings was assigned to each individual shoreline. A low rating indicates that the shoreline has already experienced substantial development and is no longer sensitive to additional development since many of the ecological components have been lost. A moderate rating indicates an area that has experience low-density development leaving many of the ecological attributes intact and would be sensitive to additional development. A high sensitivity rating was given to areas that had little or no development with most of the ecological attributes intact. Additionally, a high sensitivity rating was assigned to some areas where development has occurred but in concert with existing values and where land use is restrictive and ownership is in larger tracts.

**PFC Ratings**

Proper Functioning Condition Ratings followed the protocol outlined in Section 2.2. The individual lake inventory sheets are in Appendix A of this document.

The team evaluated the shorelines based on their capability and potential given that human influence and natural causes may have introduced components that have changed natural processes long ago and whether at this point those elements should be restored will need to be assessed at a more site-specific level. The analysis team assigned functional condition ratings and designated new shoreline management areas for the individual shorelines on the basis of changes in existing conditions from the 1996 mapping updates, size of ownership tracts, potential for maintaining current land use values, non-point pollution reduction potential, restoration and/or vegetation needs, and protection or sensitivity to development.

Ratings of low, moderate and high for each of the components evaluated in this assessment should not be considered on an individual basis but in conjunction with all ratings and the recommended change for designation. Once this process is completed additional site inventories may be necessary to determine the appropriate development requirements or mitigation that may need to be implemented as part of the permitting process for each individual shoreline.
3.0  LAKE INVENTORY

The cumulative assessment of the individual shorelines was used to prioritize the need for restoration, retention and preservation for each lake. With this cumulative assessment, Spokane County will be able to prioritize long and short-term planning needs specific to individual lakes and address actions or mitigation steps for individual shorelines.

The Lake inventory and assessment was conducted on the following Spokane County lakes:

- Clear
- Newman
- Liberty
- Silver
- Eloika
- Fish
- Williams,
- Badger,
- Medical,
- West Medical
- Granite
- Willow
- Bear
- Bonnie
- Amber
- Fishtrap
- Meadow
- Downs
- Feustral,
- Alkali,
- Hog,
- Mason
- Chapman
- Philleo
- Lonelyville
- Otter
- Ring
- Queen Lucas
- Shelley
- Horseshoe
- Woods
- Knight
- Dragoon
- Reflection
- 10 unnamed lakes

After completion of the individual shoreline assessment, the analysis team developed criteria for grouping the lakes into three categories based on the individual shoreline characterization. Each lake was categorized based on the capability and potential for 1) restoration, 2) retention, or 3) preservation based on the individual shoreline assessments outlined in Section 4.

This categorization scheme provide Spokane County Division of Planning the means to assess the larger scale needs over the long term and evaluate site specific projects over the short term through the permitting process in any of the lake areas. Additional analysis may be necessary to develop the appropriate restoration or mitigation plan for each individual shoreline and this could be a product of the permitting process. This document will serve as a tool for directing management into specific areas based on individual lake and shoreline prioritization and rating.
Lake Categorization and Prioritization

In order to categorize and prioritize the individual lakes these individual shoreline criteria were considered:

- Individual shoreline PFC ratings and shoreline assessment
- Ownership
- Land use capability and trend
- Extent or percentage of development or habitat loss
- Function and Value of habitat still in natural state.

Restoration

Lakes that were prioritized under the restoration category were areas of high development with limited ecological systems still intact. Enforcement of existing permitting requirements had been minimal causing additional loss of habitat in areas that had been designated for protection as critical areas under the GMA process. Individual shorelines for these lakes provide the greatest opportunity for restoration based on the individual shoreline assessments in Section 4.

The lakes in the restoration category were prioritized based on the above factors and the potential for recovering more of an ecological balance in areas where growth will continue. A higher priority indicates a greater potential for each lake to achieve a balance through shoreline planning regulation and restoration activities. Without protection and restoration activities the functional downward trend will be accelerated. These activities can be in conjunction with or independent of the County permitting process.

Retention

Lakes that were prioritized under the retention category were areas of moderate development with many of existing ecological systems intact. Enforcement or compliance with the existing permitting requirements appeared to have been met with greater acceptance. Very little additional losses were found in areas that had been designated for protection as Critical Areas. The lakes in the retention category were categorized based on the above criteria and their sensitivity additional development, which will affect the ecological balance and the stability of those systems. A higher priority indicates a greater need to maintain in a more natural state the remaining functioning habitat. Without this the entire system will continue its downward trend. This can be accomplished through individual shoreline planning, or conservation easements with owners, and mitigation for development of activities. These activities
can be in conjunction with or independent of the County permitting process. Individual shorelines for these lakes provide the greatest opportunity for retention based on the individual shoreline assessments in Section 4.

**Preservation**

Lakes that were prioritized under the preservation category were lakes with little or no development with most of existing ecological systems intact. Enforcement or compliance was not necessary due to lack of development. The lakes in the preservation category were prioritized based on the above criteria and their lack of development which provides opportunities for maintaining these systems in a complete state of natural progression and evolution. A higher priority indicates a greater potential to preserve those ecological values and maintain entire lake and riparian areas in a natural state. This can be accomplished through individual shoreline planning, regulatory incentives and/or conservation easements with owners. These lentic systems lend themselves for preservation. Individual shorelines for these lakes provide the greatest opportunity for preservation based on the individual shoreline assessments in Section 4.

**Table 3.1 Lake Priorities**

<table>
<thead>
<tr>
<th>RESTORATION</th>
<th>RETENTION</th>
<th>PRESERVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Clear Lake</td>
<td>1 Eloika Lake</td>
<td>1 8,12,14,19-21,23,26-28</td>
</tr>
<tr>
<td>2 Newman Lake</td>
<td>2 Downs Lake</td>
<td>2 Horseshoe Lake</td>
</tr>
<tr>
<td>3 Williams Lake</td>
<td>3 Amber Lake</td>
<td>3 Woods Lake</td>
</tr>
<tr>
<td>4 Liberty Lake</td>
<td>4 Granite Lake</td>
<td>4 Bonnie Lake</td>
</tr>
<tr>
<td>5 Silver Lake</td>
<td>5 Bear Lake</td>
<td>5 Knight Lake</td>
</tr>
<tr>
<td>6 Fish Lake</td>
<td>6 Meadow Lake</td>
<td>6 Mason Lake</td>
</tr>
<tr>
<td>8 Shelly Lake</td>
<td>7 Reflection Lake</td>
<td>7 Lonelyview-Hedin Lake</td>
</tr>
<tr>
<td>9 West Medical Lake</td>
<td>8 Badger Lake</td>
<td>8 Hog Canyon Lake</td>
</tr>
<tr>
<td>10 Medical Lake</td>
<td>9 Alkali Lake</td>
<td>9 Philleo Lake</td>
</tr>
<tr>
<td></td>
<td>10 Chapman Lake</td>
<td>10 Dragoon Lake</td>
</tr>
<tr>
<td></td>
<td>11 Fish Trap Lake</td>
<td>11 Feustal Lake</td>
</tr>
<tr>
<td></td>
<td>12 Otter Lake</td>
<td>12 Queen Lucas Lake</td>
</tr>
<tr>
<td></td>
<td>13 Ring Lake</td>
<td>13 Willow Lake</td>
</tr>
</tbody>
</table>

*All numbered lakes were rated as highest priority for preservation*