

Attachment 1 – Shoreline Management

Channel Migration Zone Regulations

RCW 90.58.100: *"In preparing the master programs, and any amendments thereto, the department and local governments shall to the extent feasible: (d) **Conduct or support such further research, studies, surveys, and interviews as are deemed necessary;***

173-26-020 (6) "Channel migration zone (CMZ)" means the area along a river within which the channel(s) can be reasonably predicted to migrate over time as a result of natural and normally occurring hydrological and related processes when considered with the characteristics of the river and its surroundings.

173-26-201(2) **Basic concepts.**

(a) **Use of scientific and technical information.** To satisfy the requirements for the use of scientific and technical information in RCW 90.58.100(1), local governments shall incorporate the following two steps into their master program development and amendment process.

First, identify and assemble the most current, accurate, and complete scientific and technical information available that is applicable to the issues of concern. The context, scope, magnitude, significance, and potential limitations of the scientific information should be considered. At a minimum, make use of and, where applicable, incorporate all available scientific information, aerial photography, inventory data, technical assistance materials, manuals and services from reliable sources of science. Local governments should also contact relevant state agencies, universities, affected Indian tribes, port districts and private parties for available information. While adequate scientific information and methodology necessary for development of a master program should be available, if any person, including local government, chooses to initiate scientific research with the expectation that it will be used as a basis for master program provisions, that research shall use accepted scientific methods, research procedures and review protocols. Local governments are encouraged to work interactively with neighboring jurisdictions, state resource agencies, affected Indian tribes, and other local government entities such as port districts to address technical issues beyond the scope of existing information resources or locally initiated research.

Local governments should consult the technical assistance materials produced by the department. When relevant information is available and unless there is more current or specific information available, those technical assistance materials shall constitute an element of scientific and technical information as defined in these guidelines and the use of which is required by the act.

Second, base master program provisions on an analysis incorporating the most current, accurate, and complete scientific or technical information available. Local governments should be prepared to identify the following:

(i) Scientific information and management recommendations on which the master program provisions are based;

(ii) Assumptions made concerning, and data gaps in, the scientific information; and

(iii) Risks to ecological functions associated with master program provisions. Address potential risks as described in WAC [173-26-201](#) (3)(d).

The requirement to use scientific and technical information in these guidelines does not limit a local jurisdiction's authority to solicit and incorporate information, experience, and anecdotal evidence provided by interested parties as part of the master program amendment process. Such information should be solicited through the public participation process described in WAC [173-26-201](#) (3)(b). Where information collected by or provided to local governments conflicts or is inconsistent, the local government shall base master program provisions on a reasoned, objective

evaluation of the relative merits of the conflicting data.

173-26-201(3)(c) **Inventory shoreline conditions.** Gather and incorporate all pertinent and available information, existing inventory data and materials from state agencies, affected Indian tribes, watershed management planning, port districts and other appropriate sources. Ensure that, whenever possible, inventory methods and protocols are consistent with those of neighboring jurisdictions and state efforts. The department will provide, to the extent possible, services and resources for inventory work. Contact the department to determine information sources and other relevant efforts. **Map inventory information at an appropriate scale.**

Local governments shall be prepared to demonstrate how the inventory information was used in preparing their local master program amendments.

Collection of additional inventory information is encouraged and should be coordinated with other watershed, regional, or statewide inventory and planning efforts in order to ensure consistent methods and data protocol as well as effective use of fiscal and human resources. Local governments should be prepared to demonstrate that they have coordinated with applicable inter-jurisdictional shoreline inventory and planning programs where they exist. Two or more local governments are encouraged to jointly conduct an inventory in order to increase the efficiency of data gathering and comprehensiveness of inventory information. Data from inter-jurisdictional, watershed, or regional inventories may be substituted for an inventory conducted by an individual jurisdiction, provided it meets the requirements of this section.

Local government shall, at a minimum, and to the extent such information is relevant and reasonably available, collect the following information:

(i) Shoreline and adjacent land use patterns and transportation and utility facilities, including the extent of existing structures, impervious surfaces, vegetation and shoreline modifications in shoreline jurisdiction. Special attention should be paid to identification of water-oriented uses and related navigation, transportation and utility facilities.

(ii) Critical areas, including wetlands, aquifer recharge areas, fish and wildlife conservation areas, **geologically hazardous areas, and frequently flooded areas. See also WAC 173-26-221.**

(iii) Degraded areas and sites with potential for ecological restoration.

(iv) Areas of special interest, such as priority habitats, developing or redeveloping harbors and waterfronts, previously identified toxic or hazardous material clean-up sites, dredged material disposal sites, or eroding shorelines, to be addressed through new master program provisions.

(v) Conditions and regulations in shoreland and adjacent areas that affect shorelines, such as surface water management and land use regulations. This information may be useful in achieving mutual consistency between the master program and other development regulations.

(vi) Existing and potential shoreline public access sites, including public rights of way and utility corridors.

(vii) General location of channel migration zones, and flood plains.

(viii) Gaps in existing information. During the initial inventory, local governments should identify what additional information may be necessary for more effective shoreline management.

(ix) If the shoreline is rapidly developing or subject to substantial human changes such as clearing and grading, past and current records or historical aerial photographs may be necessary to identify cumulative impacts, such as bulkhead construction, intrusive development on priority habitats, and conversion of harbor areas to nonwater-oriented uses.

(x) If archaeological or historic resources have been identified in shoreline jurisdiction, consult with the state historic preservation office and local affected Indian tribes regarding existing archaeological and historical information.

173-26-201 (3) **Steps in preparing and amending a master program. (d) Analyze shoreline issues of concern.** Before establishing specific master program provisions, local governments shall analyze the information gathered in (c) of this subsection and as necessary to ensure effective shoreline management provisions, address the topics below, where applicable.

(i) **Characterization of functions and ecosystem-wide processes.**

(A) Prepare a characterization of shoreline ecosystems and their associated ecological functions. The characterization consists of three steps:

(I) Identify the ecosystem-wide processes and ecological functions based on the list in (d)(i)(C) of this subsection that apply to the shoreline(s) of the jurisdiction.

(II) Assess the ecosystem-wide processes to determine their relationship to ecological functions present within the jurisdiction and identify which ecological functions are healthy, which have been significantly altered and/or adversely impacted and which functions may have previously existed and are missing based on the values identified in (d)(i)(D) of this subsection; and

(III) Identify specific measures necessary to protect and/or restore the ecological functions and ecosystem-wide processes.

(D) The overall condition of habitat and shoreline resources are determined by the following ecosystem-wide processes and ecological functions:

The range of flow variability sufficient to create and sustain fluvial, aquatic, and wetland habitats, the patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows, and duration of flood plain inundation and water table elevation in meadows and wetlands.

The species composition and structural diversity of plant communities in river and stream areas and wetlands that provides summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of woody debris sufficient to sustain physical complexity and stability.

173-26-221(2)(c)(ii) **Geologically hazardous areas.** Development in designated geologically hazardous areas shall be regulated in accordance with the following:

(A) Consult minimum guidelines for geologically hazardous areas, WAC 365-190-080(4).

WAC 365-190-080 (4) Geologically hazardous areas.

(a) Geologically hazardous areas include areas susceptible to erosion, sliding, earthquake, or other geological events. They pose a threat to the health and safety of citizens when incompatible commercial, residential, or industrial development is sited in areas of significant hazard. Some geological hazards can be reduced or mitigated by engineering, design, or modified construction or mining practices so that risks to health and safety are acceptable. When technology cannot reduce risks to acceptable levels, building in geologically hazardous areas is best avoided. This distinction should be considered by counties and cities that do not now classify geological hazards as they develop their classification scheme.

(a) Areas that are susceptible to one or more of the following types of hazards shall be classified as a geologically hazardous area:

(i) Erosion hazard;

(ii) Landslide hazard;

(iii) Seismic hazard; or

(iv) Areas subject to other geological events such as coal mine hazards and volcanic hazards including: Mass wasting, debris flows, rockfalls, and differential settlement.

(b) Counties and cities should classify geologically hazardous area as either:

- (i) Known or suspected risk;
- (ii) No risk;
- (iii) Risk unknown - data are not available to determine the presence or absence of a geological hazard.

(c) Erosion hazard areas are at least those areas identified by the United States Department of Agriculture Soil Conservation Service as having a "severe" rill and inter-rill erosion hazard.

(d) Landslide hazard areas shall include areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include any areas susceptible because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Example of these may include, but are not limited to the following:

(i) Areas of historic failures, such as:

(A) Those areas delineated by the United States Department of Agriculture Soil Conservation Service as having a "severe" limitation for building site development;

(B) Those areas mapped as class u (unstable), uos (unstable old slides), and urs (unstable recent slides) in the department of ecology coastal zone atlas; or

(C) Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published as the United States Geological Survey or department of natural resources division of geology and earth resources.

(ii) Areas with all three of the following characteristics:

(A) Slopes steeper than fifteen percent; and

(B) Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and

(C) Springs or ground water seepage;

(iii) Areas that have shown movement during the holocene epoch (from ten thousand years ago to the present) or which are underlain or covered by mass wastage debris of that epoch;

(iv) Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;

(v) Slopes having gradients steeper than eighty percent subject to rockfall during seismic shaking;

(vi) Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action;

(vii) Areas that show evidence of, or are at risk from snow avalanches;

(viii) Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding;

(ix) Any area with a slope of forty percent or steeper and with a vertical relief of ten or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top and measured by averaging the inclination over at least ten feet of vertical relief.

(e) Seismic hazard areas shall include areas subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, soil liquefaction, or surface faulting. One indicator of potential for future earthquake damage is a record of earthquake damage in the past. Ground shaking is the primary cause of earthquake damage in Washington. The strength of ground shaking is primarily affected by:

(i) The magnitude of an earthquake;

(ii) The distance from the source of an earthquake;

(iii) The type of thickness of geologic materials at the surface; and

(iv) The type of subsurface geologic structure.

Settlement and soil liquefaction conditions occur in areas underlain by cohesionless soils of low density, typically in association with a shallow ground water table.

(f) Other geological events:

(i) Volcanic hazard areas shall include areas subject to pyroclastic flows, lava flows, debris avalanche, inundation by debris flows, mudflows, or related flooding resulting from volcanic activity.

(ii) Mine hazard areas are those areas underlain by, adjacent to, or affected by mine workings such as adits, gangways, tunnels, drifts, or air shafts. Factors which should be considered include: Proximity to development, depth from ground surface to the mine working, and geologic material.

173-26-221(2)(c)(ii) **Geologically hazardous areas (con't)**

(B) Do not allow new development or the creation of new lots that would cause foreseeable risk from geological conditions to people or improvements during the life of the development.

(C) Do not allow new development that would require structural shoreline stabilization over the life of the development. Exceptions may be made for the limited instances where stabilization is necessary to protect allowed uses where no alternative locations are available and no net loss of ecological functions will result. The stabilization measures shall conform to WAC [173-26-231](#).

(D) Where no alternatives, including relocation or reconstruction of existing structures, are found to be feasible, and less expensive than the proposed stabilization measure, stabilization structures or measures to protect existing primary residential structures may be allowed in strict conformance with WAC [173-26-231](#) requirements and then only if no net loss of ecological functions will result.

173-26-221(2)(A)(iv) **Critical freshwater habitats.** (A) **Applicability.** The following applies to master program provisions affecting critical freshwater habitats, including those portions of streams, rivers, wetlands, and lakes, **their associated channel migration zones**, and flood plains designated as such.

173-26-221(2)(B)(iv) (I) Planning for protection, and restoration where appropriate, along the entire length of the corridor from river headwaters to the mouth; and

173-26-221(2)(B)(iv) (II) Regulating uses and development within the stream channel, **associated channel migration zone**, wetlands, and the flood plain, to the extent such areas are in the shoreline jurisdictional area, as necessary to assure no net loss of ecological functions associated with the river or stream corridors, including the associated hyporheic zone, results from new development.

As part of a comprehensive approach to management of critical freshwater habitat and other river and stream values, local governments should integrate master program provisions, including those for shoreline stabilization, fill, vegetation conservation, water quality, flood hazard reduction, and specific uses, to protect human health and safety and to protect and restore the corridor's ecological functions and ecosystem-wide processes.

173-26-221(3) **Flood hazard reduction.**

(a) **Applicability.** The following provisions apply to actions taken to reduce flood damage or hazard and to uses, development, and shoreline modifications that may increase flood hazards. Flood hazard reduction measures may consist of nonstructural measures, such as setbacks, land use controls, wetland restoration, dike removal, use relocation, biotechnical measures, and storm water management programs, and of structural measures, such as dikes, levees, revetments, floodwalls, channel realignment, and elevation of structures consistent with the National Flood Insurance Program. Additional relevant critical area provisions are in WAC [173-26-221\(2\)](#).

(b) **Principles.** **Flooding of rivers, streams, and other shorelines is a natural process that is affected by factors and land uses occurring throughout the watershed. Past land use practices have disrupted hydrological processes and increased the rate and volume of runoff, thereby exacerbating flood hazards and reducing ecological functions. Flood hazard reduction measures are most effective when integrated into comprehensive strategies that recognize the natural hydrogeological and biological processes of water bodies. Over the long term, the most effective means of flood hazard reduction is to prevent or remove development in flood-prone areas, to manage storm water within the flood plain, and to maintain or restore river and stream system's natural hydrological and geomorphological processes.**

Structural flood hazard reduction measures, such as diking, even if effective in reducing inundation in a portion of

the watershed, can intensify flooding elsewhere. Moreover, structural flood hazard reduction measures can damage ecological functions crucial to fish and wildlife species, bank stability, and water quality. Therefore, structural flood hazard reduction measures shall be avoided whenever possible. When necessary, they shall be accomplished in a manner that assures no net loss of ecological functions and ecosystem-wide processes.

The dynamic physical processes of rivers, including the movement of water, sediment and wood, cause the river channel in some areas to move laterally, or "migrate," over time. This is a natural process in response to gravity and topography and allows the river to release energy and distribute its sediment load. The area within which a river channel is likely to move over a period of time is referred to as the channel migration zone (CMZ) or the meander belt. Scientific examination as well as experience has demonstrated that interference with this natural process often has unintended consequences for human users of the river and its valley such as increased or changed flood, sedimentation and erosion patterns. It also has adverse effects on fish and wildlife through loss of critical habitat for river and riparian dependent species. Failing to recognize the process often leads to damage to, or loss of, structures and threats to life safety.

Applicable shoreline master programs should include provisions to limit development and shoreline modifications that would result in interference with the process of channel migration that may cause significant adverse impacts to property or public improvements and/or result in a net loss of ecological functions associated with the rivers and streams. (See also (c) of this subsection.)

The channel migration zone should be established to identify those areas with a high probability of being subject to channel movement based on the historic record, geologic character and evidence of past migration. It should also be recognized that past action is not a perfect predictor of the future and that human and natural changes may alter migration patterns. Consideration should be given to such changes that may have occurred and their effect on future migration patterns.

For management purposes, the extent of likely migration along a stream reach can be identified using evidence of active stream channel movement over the past one hundred years. Evidence of active movement can be provided from historic and current aerial photos and maps and may require field analysis of specific channel and valley bottom characteristics in some cases. A time frame of one hundred years was chosen because aerial photos, maps and field evidence can be used to evaluate movement in this time frame.

In some cases, river channels are prevented from normal or historic migration by human-made structures or other shoreline modifications. The definition of channel migration zone indicates that in defining the extent of a CMZ, local governments should take into account the river's characteristics and its surroundings. Unless otherwise demonstrated through scientific and technical information, the following characteristics should be considered when establishing the extent of the CMZ for management purposes:

- Within incorporated municipalities and urban growth areas, areas separated from the active river channel by legally existing artificial channel constraints that limit channel movement should not be considered within the channel migration zone.
- All areas separated from the active channel by a legally existing artificial structure(s) that is likely to restrain channel migration, including transportation facilities, built above or constructed to remain intact through the one hundred-year flood, should not be considered to be in the channel migration zone.
- In areas outside incorporated municipalities and urban growth areas, channel constraints and flood control structures built below the one hundred-year flood elevation do not necessarily restrict channel migration and should not be considered to limit the channel migration zone unless demonstrated otherwise using scientific and technical information.

Master programs shall implement the following principles:

- (iv) Assure that flood hazard protection measures do not result in a net loss of ecological functions associated with

the rivers and streams.

(v) Plan for and facilitate returning river and stream corridors to more natural hydrological conditions. Recognize that seasonal flooding is an essential natural process.

(vi) When evaluating alternate flood control measures, consider the removal or relocation of structures in flood-prone areas.

(vii) Local governments are encouraged to plan for and facilitate removal of artificial restrictions to natural channel migration, restoration of off channel hydrological connections and return river processes to a more natural state where feasible and appropriate.

(c) **Standards.** Master programs shall implement the following standards within shoreline jurisdiction:

(i) Development in flood plains should not significantly or cumulatively increase flood hazard or be inconsistent with a comprehensive flood hazard management plan adopted pursuant to chapter 86.12 RCW, provided the plan has been adopted after 1994 and approved by the department. New development or new uses in shoreline jurisdiction, including the subdivision of land, should not be established when it would be reasonably foreseeable that the development or use would require structural flood hazard reduction measures within the channel migration zone or floodway. The following uses and activities may be appropriate and/or necessary within the channel migration zone or floodway:

- Actions that protect or restore the ecosystem-wide processes or ecological functions.
- Forest practices in compliance with the Washington State Forest Practices Act and its implementing rules.
- Existing and ongoing agricultural practices, provided that no new restrictions to channel movement occur.
- Mining when conducted in a manner consistent with the environment designation and with the provisions of WAC [173-26-241](#) (3)(h).
- Bridges, utility lines, and other public utility and transportation structures where no other feasible alternative exists or the alternative would result in unreasonable and disproportionate cost. Where such structures are allowed, mitigation shall address impacted functions and processes in the affected section of watershed or drift cell.
- Repair and maintenance of an existing legal use, provided that such actions do not cause significant ecological impacts or increase flood hazards to other uses.
- Development with a primary purpose of protecting or restoring ecological functions and ecosystem-wide processes.
- Modifications or additions to an existing nonagricultural legal use, provided that channel migration is not further limited and that the new development includes appropriate protection of ecological functions.
- Development in incorporated municipalities and designated urban growth areas, as defined in chapter 36.70A RCW, where existing structures prevent active channel movement and flooding.
- Measures to reduce shoreline erosion, provided that it is demonstrated that the erosion rate exceeds that which would normally occur in a natural condition, that the measure does not interfere with fluvial hydrological and geomorphological processes normally acting in natural conditions, and that the measure includes appropriate mitigation of impacts to ecological functions associated with the river or stream.

(ii) Allow new structural flood hazard reduction measures in shoreline jurisdiction only when it can be demonstrated by a scientific and engineering analysis that they are necessary to protect existing development, that

nonstructural measures are not feasible, that impacts on ecological functions and priority species and habitats can be successfully mitigated so as to assure no net loss, and that appropriate vegetation conservation actions are undertaken consistent with WAC [173-26-221\(5\)](#).

Structural flood hazard reduction measures shall be consistent with an adopted comprehensive flood hazard management plan approved by the department that evaluates cumulative impacts to the watershed system.

(iii) Place new structural flood hazard reduction measures landward of the associated wetlands, and designated vegetation conservation areas, except for actions that increase ecological functions, such as wetland restoration, or as noted below. Provided that such flood hazard reduction projects be authorized if it is determined that no other alternative to reduce flood hazard to existing development is feasible. The need for, and analysis of feasible alternatives to, structural improvements shall be documented through a geotechnical analysis.

(iv) Require that new structural public flood hazard reduction measures, such as dikes and levees, dedicate and improve public access pathways unless public access improvements would cause unavoidable health or safety hazards to the public, inherent and unavoidable security problems, unacceptable and unmitigable significant ecological impacts, unavoidable conflict with the proposed use, or a cost that is disproportionate and unreasonable to the total long-term cost of the development.

(v) Require that the removal of gravel for flood management purposes be consistent with an adopted flood hazard reduction plan and with this chapter and allowed only after a biological and geomorphological study shows that extraction has a long-term benefit to flood hazard reduction, does not result in a net loss of ecological functions, and is part of a comprehensive flood management solution.

173-26-231(3)(c) **Fill.** Fills shall be located, designed, and constructed to protect shoreline ecological functions and ecosystem-wide processes, including channel migration.

173-26-231(3)(f) ...Disposal of dredge material on shorelands or wetlands **within a river's channel migration zone** shall be discouraged. In the limited instances where it is allowed, such disposal shall require a conditional use permit. This provision is not intended to address discharge of dredge material into the flowing current of the river or in deep water within the channel where it does not substantially affect the geohydrologic character of the channel migration zone.

173-26-231(3)(h)(ii)(E) Mining within any **channel migration zone that is within Shoreline Management Act jurisdiction** shall require a shoreline conditional use permit.