Chapter 6:

CONCLUSIONS

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6.1 SUMMARY

This final chapter of the Best Available Science report, Volume II: Assessment of Proposed Ordinances provides conclusions for each of the critical areas. The overall assessment of the proposed Critical Areas Ordinance, and the related Stormwater, and Clearing and Grading Ordinances, indicates that the Washington Administrative Code requirement to include best available science in the development of policies and recommendations was met with five departures. A departure occurs when the proposed standard is outside of the range of best available science recommendations. The departures are as follows:

(1) Volcanic hazard area mapping is incomplete;

(2) Type N waters buffers do not provide full riparian functionality that, in turn, effects microclimate and wildlife;

(3) Buffers for Type O streams are outside of BAS recommendations for riparian functions; and

(4) In the general application of farm planning, inadequately sized buffers and best management practices (BMPs) provide only improved water quality benefits and generally have a negative effect on other aquatic, wildlife, and wetland functions and values.

(5) Wetland buffer widths within Urban Growth Areas depart from BAS recommendation for protecting wetland functions and values.

There are also some general or partial inconsistencies between the CAO standards and BAS recommendations. These occur when one or more of the multiple functions and values of a critical area are not protected and there is a high degree of uncertainty. Uncertainty can be with either the best available science, or the ability to predict the effects of development or other disturbances on aquatic, wildlife, or wetland areas. These partial inconsistencies are as follows: (1) CAO protection for osprey is for the primary nesting site, but BAS also suggests protecting alternative nesting sites and preventing human disturbance in the breeding habitat; (2) CAO protection for Vaux's swift is also for the primary nesting site, but not for alternative sites as suggested by BAS; and (3) allowed alterations and exemptions are not addressed by BAS and are difficult to predict as to the number and pattern of occurrence, however they can, over time, cumulatively impact aquatic and wetland functions.

In addition to the critical area conclusions, this chapter also includes the overall risk assessment summaries for Aquatic Areas, Wildlife Areas, and Wetlands. These indicate that most regulations provide for an acceptable level of risk, however there are a number of uncertainties associated with the risks. Adaptive management is recommended to address changes that can not be accounted for due to these uncertainties.

6.2 FLOOD HAZARD AREAS

King County's river management program and flood hazard regulations are among the most contemporary in the country and are considered by many as the best available science for floodplain management. King County could increase the level of safety by adopting even higher standards than what are proposed in the critical areas, stormwater and clearing and grading ordinance. For example, King County delineates a flood hazard area based on the 100-year existing conditions flood event. Some communities delineate a flood hazard area on a 500-year future conditions flood event, which would result in a much wider floodplain. A few communities require the lowest floor of structures to be constructed up to two feet above the base flood elevation, where King County only requires a one-foot freeboard. While some communities have adopted specific higher regulatory standards than King County, an overall assessment of King County's flood hazard regulations shows they are well within the range of protection described in the best available science literature.

6.3 CHANNEL MIGRATION ZONE (CMZ)

The King County classification and definition of Channel Migration Zone (CMZ) was compared to information in best available science and discussed in regard to four issues. The King County approach to mapping and regulating CMZs equals or exceeds other examples with regard to determining the lateral extent of CMZ, and it is consistent with literature examples with regard to evaluating levees and revetments as CMZ boundaries. King County's approach to mapping CMZs implicitly considers the effect of LWD on channel migration. Certain specific findings from scientific literature on this issue do not appear to be applicable to the lowland mainstem channels of King County. King County's CMZ mapping approach does not explicitly consider the effect of landslides on channel migration. But the combination of existing King County regulations on landslide hazard, erosion hazard, seismic hazard and channel migration hazard should be equivalent to the approaches in literature that call for explicit coupling of hillslope erosion and fluvial channel migration processes. In all, King County's approach to classification and definition of CMZs is consistent with approaches described in literature on CMZ mapping.

Within King County's fixed regulations, the restrictions on development to protect public safety apply to the moderate channel migration hazard area within the overall CMZ. Since the very delineation of a moderate channel migration hazard area equals or exceeds the delineation of CMZ boundaries typical in literature, any land use restriction within the moderate would also equal or exceed BAS standards.

Land use permitted within the severe hazard area is listed as Allowed Alterations. The King County severe channel migration hazard area is based on 100 years worth of lateral channel migration, and is therefore consistent with BAS on this topic. The determination of what land use is allowed within this part of the CMZ is based upon a policy decision rather than a science-based determination, and therefore not restricted by BAS criteria. The allowed land uses listed above generally are consistent with CMZ regulations from other jurisdictions, which are comparable but not necessarily science based.

6.4 GEOLOGIC HAZARD AREAS

Seismic Hazard Areas

Proposed CAO standards for Seismic Hazard Areas are consistent with best available science.

Erosion Hazard Areas

Proposed CAO standards for Erosion Hazard Areas are consistent with best available science. It is recommended that King County pursue evaluations using a more detailed system of Erosion Hazard classification, as suggested in the literature review. Use of such a system will allow the County to more directly tailor development infill and appropriate best management practices to the local soil and hydrologic conditions. Introduction of this system could occur either as a code revision or, more simply, as a permit condition.

Landslide Hazard Areas

Proposed Landslide Hazard Area provisions of the CAO are consistent with best available science and are likely to have a direct positive impact on overall slope stability. Construction practices that are specified in special studies that are required under the CAO oftentimes provide an increase in overall slope stability as expressed as a Factor of Safety. Regulation of development in Landslide Hazard Areas should continue to protect health and safety of the public. Additionally, these regulations provide additional protection against erosion and sedimentation in areas that are typically problematic.

Volcanic Hazard Areas

Proposed Volcanic Hazard Areas provisions of the CAO are generally consistent with best available science except for the last provision that precludes regulation until such time as the mapping and modeling of these areas is adopted or incorporated into the CAO. This is a clear departure from BAS. The proposed CAO will remain inconsistent with BAS until this is resolved.

Coal Mine Hazard Areas

Proposed CAO standards for Coal Mine Hazard Areas are consistent with best available science.

6.5 CRITICAL AQUIFER RECHARGE AREAS (CARA)

The proposed CAO targets existing concerns within King County with respect to critical aquifer recharge areas based on the best available science. Ongoing modeling efforts within King County have the objective of including groundwater information (e.g., stream reaches that are recharging/discharging) that will enable better decisions on land use and water management for fish/habitat purposes. As more resources become available, it may also be possible to refine the CARA categories based on travel distances to water supply systems and biological degradation rates. A periodic review of the categorization of critical aquifer recharge areas and land-use

restrictions is needed since water quantity use patterns and contamination risks for land-use activities may change.

6.6 AQUATIC AREAS

The proposed CAO and Stormwater Ordinances updates are a major improvement in protections for aquatic resources, with provisions for comprehensive protection of not only specific aquatic areas but also the ecological processes that form and sustain them. For the most part, the proposed standards and the institutional context in which they were developed, and would later be implemented, are highly consistent with aquatic area protection BAS. However, some standards depart from BAS recommendations. These departures are: (1) lack of effective buffers for microclimate control, (2) small buffers on Type O waters, and, (3) in the general application of farm planning, inadequately sized buffers and BMPs to provide more than improved water quality benefits.

Biologically, the proposal is a relatively low incremental risk strategy for protection of salmonids and salmonid habitat forming processes. The overall proposal is not "no impact," however, and as a result pollution and change intolerant species could be placed at moderate to high risk. In freshwater, examples of such species may include pacific giant salamanders, tailed frogs, freshwater mussels, and certain long-lived species of stoneflies. In marine waters, particularly sensitive species include eel grass, beach spawning forages fish, such as surf smelt and sandlance, and certain halophytic plants (dune grasses and sedges) that rely on soft, sandy shorelines.

Major uncertainties that could increase risk include a lack of knowledge about local conditions and sensitive species, and the efficacy of the proposed standards. Also, a wide variety of alterations would be given special dispensation to occur in aquatic areas or their buffers. Individually the impacts of these may be small, but they will create additional burden on habitats and species and if they occur at high frequency, may have a significant cumulative impact.

One uncertainty that may actually reduce risk is the proposal's combination of both riparian *and* upland protection measures, which may help to offset their individual weaknesses. For example, having clearing restrictions to protect vegetation across the broader landscape could help to offset the effects of buffers that may be too small.

6.7 WILDLIFE AREAS

One of the goals of the King County Comprehensive Plan is to protect biodiversity. King County attempts to preserve biodiversity largely at the scale of the individual species by protecting specific breeding habitats through site-specific application of regulations. A wildlife habitat network is also protected by critical area designation. The risk analysis was performed under these assumptions: (1) current and future connections across the landscape will continue to allow dynamic interactions and dispersals of individuals and populations; (2) prey species of all evaluated species will maintain stable populations in the face of new development; (3) the ecosystem requirements of each evaluated species will be addressed by consideration of its needs without consideration of its interdependence across the landscape; and (4) all regulations in the code will be implemented appropriately and in full compliance with the code. Another

Table 6.1. Summary of BAS Assessment Conclusions for Aquatic Areas

Standard	Consistency with BAS – Do the standards overlap the scientific literature? Numbers in parenthesis are a scale of 1 (low) to –10 (high).	Level of Risk (The standards likelihood of not protecting a function).	Level of Uncertainty (1)To what degree of confidence is BAS clear on what's needed? and (2) Are the potential effects clear?	Comments
Buffers				Overall: Generally low incremental risk for salmonids and species with similar needs. Moderate to high risk for highly sensitive species such as amphibians.
Type S/F	Low (3-4) for micro-climate and most wildlife Medium (7) for large woody debris High (9) for all other functions.	High for microlimate Medium for large woody debris Low for all other functions	Low (meaning little uncertainty on both counts)	
Type N	Low (3-4) for microclimate and most wildlife Medium (7) for large woody debris High (9) for all other functions	High for microlimate Medium for large woody debris Low for all other functions	Low	
Type O	Does not meet BAS	High for all functions	High due to uncertainty of number and extent of these types of habitats and species that inhabit them.	The likelihood is that very few habitats will be Type 0. Thus, the likelihood for serious loss of biological value is probably small.
Allowed Alterations	Low (0)	Moderate to high depending on extent and frequency of the alterations.	High	Although each incursion allowed by this standard is likely small, there is no spacial or temporal limit per unit area. Thus cumulative effects have the potential to be high.

Standard	Consistency with BAS – Do the standards overlap the scientific literature? Numbers in parenthesis are a scale of 1 (low) to –10 (high).	Level of Risk (The standards likelihood of not protecting a function).	Level of Uncertainty (1)To what degree of confidence is BAS clear on what's needed? and (2) Are the potential effects clear?	Comments
Mitigation	See Wetlands chapter			
Clearing Restrictions (35 percent Clearing Restriction)	High (9)	Generally low but could be moderate where the watershed has naturally high erosion, as determined by degree of slope and soils	Low with regard to general value of action High because of lack of data on effectiveness and because standard is not a "no impact"	
Stormwater Control	High (9)	Low	Low with regard to value of action High with regard to effectiveness for removing endocrine disruptor chemicals.	
Farm Planning BMPs	TBD	TBD	TBD	
Rural Stewardship Planning	High (8) with regards to concept. Low to moderate (3-7) for microclimate and LWD functions, respectively.	Same as for Buffers	High due to uncertainty about the extent and frequency of application	

assumption made by King County is that the various protections in the County code will all combine such that the first three assumptions above are true.

A risk assessment was performed for species and habitats protected by critical areas regulations. Table 6-2 summarizes the risk to the species as a result of the proposed CAO standards, as well as a summary of the uncertainty associated with the estimation of risk. King County has proposed to protect wildlife areas through the implementation of critical area designation for select species, protection of priority habitat through incentives, short-term protection of breeding sites for lower priority wildlife, and establishment of landscape-level network corridors. Additional wildlife habitat will be preserved through the designation of wetland and aquatic critical areas. Within this framework, King County is attempting to assure that priority species are adequately protected and that sufficient priority habitat will be retained so these and other species maintain their population levels within the County.

As noted in the table below, high levels of uncertainty are associated with almost all species analyzed. The reasons for the high levels of uncertainty: (1) may vary among species; (2) are often related to the amount of available science for each species in the Western Washington region; and (3) are discussed individually in the respective risk assessments. Additionally, very little is generally known about where these species and habitat occur throughout the County; what it takes to protect all of their life history needs in King County; and the long-term extent to which the combination of development and other protections and allowances in the code will affect their

Table 6-2. Species and Habitat protected as Critical Areas[1]

Species/Habitat	Risk	Uncertainty
Bald Eagle	None	High
Great Blue Heron	Short term: Low Long term: Moderate.	High
Marbled Murrelet	None	Moderate
Northern Goshawk	Short- and long-term: Low	High
Osprey	Short- and long-term: Low	High
Peregrine Falcon	None	Moderate
Northern Spotted Owl	None	Low
Townsend's big-eared bat	Low	High
Vaux's Swift	Short term: Low Long term: Moderate.	High
Red-tailed Hawk	Short term: Low Long term: Unknown	High
Remaining "Shall" species	Unknown	High
Wildlife Habitat Network	Short term: Low Long term: Unknown	High

[1] Note: King County proposes to implement protection measures for the bald eagle, spotted owl, and marbled murrelet (listed species) that are currently implemented by Washington State and U.S. Fish and Wildlife Service. This approach assumes that the existing protection measures are consistent with best available science, and therefore no risk assessment was performed.

populations. For every protection mechanism discussed above, long-term monitoring programs would be essential to determine if the wildlife protection mechanisms are viable and to provide King County with feedback for improving them as necessary through adaptive management.

6.8 WETLANDS

The proposed Critical Areas Ordinance, for the most part, will protect wetland functions and values to a greater extent than the existing Sensitive Areas Ordinance (SAO) in rural areas but, most likely, will result in the continued loss of wetland functions in urban areas. Whether the proposed ordinance will result in "no-net loss" of functions and values will depend on individual wetland characteristics and their landscape context. Even within rural areas, achievement of this goal is further conditioned by the strategic location of the 35 percent clearing requirement. Finally, the overall risk may remain high without strong and continuous participation, monitoring and enforcement within stewardship programs in the Rural Area, and with the further isolation of wetlands from each other and with smaller buffer widths in the urban area.

The overall risk of the proposed CAO standards to specific wetland functions is discussed below. Summary Table 6.3 presents the relative risk to eight wetland functions and sub-functions under different conservation actions within rural areas. Risk to all naturally occurring wetland functions and values should they be found in urban wetlands within forested and otherwise naturally occurring adjoining vegetation, will increase with the continued application of King County's existing fixed SAO wetland buffers.

Considerable literature exists regarding wetland classification, function, and monitoring. In contrast, less information is available on specific methods and criteria for protecting the processes that drive wetland functions. In many cases empirical information is unavailable regarding the specific roles adjoining areas, watersheds, and landscape units play in influencing wetland processes and their specific functions. Yet best available science indicates that processes and landscape context are critical to protecting wetland functions. Thus, uncertainty increases on whether the CAO standards may protect specific wetland functions when: (1) processes are included and (2) distance increases from the wetland into the landscape. In conclusion, protection of wetland integrity must include watershed and landscape planning that: (1) identifies critical wetland functions for conservation; (2) identifies the processes necessary for their continuance; and (3) provides conservation through a variety of appropriate measures.

Hydrology

The potential risk to wetland hydrology is incremental and gradual, although it may be exacerbated in some wetlands depending on the extent of associated watershed development, watershed/wetland area ratio, and imperviousness. Moreover, the level of potential risk depends on the existing level of impact and closeness to potential hydroperiod threshold levels and watershed condition. Given that wetlands and watersheds are in good condition, the general short term (i.e., 5-year) overall risk to wetlands may be low. In general, the long-term (i.e., 25-year) potential risk may also be low if compliance with proposed standards is fully implemented.

Potential risk to hydrological and flood control functions is greater in watersheds and basins in which geology, soils, and vegetation inhibit infiltration. Hydrological risk is also greatest in unincorporated urban areas that mimic these limitations through clearing and development compared to rural areas, such as the agriculture and forest production districts. Larger buffers in rural areas, recommended by the proposed wetland reclassification, may provide some level of additional hydrological protection, regardless of zoning, yet remain dependent on the wetland watershed context. Buffer averaging, buffer reductions with concomitant enhancement, and mitigation ratios provide opportunities for better protection of targeted functions. Maintaining watersheds in vegetated conditions such as proposed in the 35 percent clearing restriction and stormwater standards may minimize the greatest risk to wetland hydrology compared to site specific conditions, however, specific wetland recharge areas and other targeted wetland-hydrologic protections provide the greatest potential for reduction of risk.

Table 6.3 Summary of relative risk to eight wetland functions and sub-functions under different conservation actions within rural areas.

Function	Fixed Buffers Only	Fixed Buffers with Wetland Complexes & Connectivity to Wildlife Network	Buffer Averaging	Reduced Buffers + Enhancement in large Parcel	With 65/10 in Watershed/ Sub-basin	Impact (yr.) <+5 >5 with 65/10 without 65/10
Hydrology (depends 1^0 on imperviousness &/or geology, slope, soil porosity & vegetation)	High	NA	High (don't expect that much improvement)	Moderate (improvement depends on stewardship plan & size of parcel)	Low	Low High
Groundwater Interchange (depends 1^0 on imperviousness & or geology, slope, soil porosity & vegetation)	High	NA (marginal improvement)	High (don't expect that much improvement)	Moderate (improvement depends on stewardship plan & size of parcel)	Low	Low Low High
Water Quality Enhancement Depends 1^0 on slope and vegetation cover	Low to Moderate (exceptions could be pathogens, pesticides, herbicides + pharmaceuticals)	NA (or could increase pathogen risk from wildlife)	Low (could change significantly depending on type of pollutants)	Low (could increase depending on type of pollutants)	Low	Low Low Low Low
Vegetation & Habitat	High (buffer will change from changing microclimate &	NA	NA	High→Low (could be downgraded to low with good site-specific	Low (if adjoining)	Low Low Low High

Table 6.2, continued

Function	Fixed Buffers Only	Fixed Buffers with Wetland Complexes & Connectivity to Wildlife Network	Buffer Averaging	Reduced Buffers + Enhancement in large Parcel	With 65/10 in Watershed/ Sub-basin	Impact (yr.) <+5 >5 with 65/10 without 65/10
	be prone to invasion by exotics)			plan)		
Wildlife amphibians	High (Low core habitat, invasion by exotic plants & animals, fragmentation effects)	High→Low (depend on adjacency to core habitat)	High (most likely will not add much core habitat)	Moderate (could reduce risk significantly depending on access, area & habitat condition)s	Low (could further reduce risk significantly depending on access, area & habitat condition)	Low Low High High
Wildlife reptiles	Moderate (Low core habitat, pets, fragmentation)	Moderate (depends on adjacency to core habitat)	Low (most likely will not add much core habitat)	Low	Low	Low Low High High
Wildlife birds	High (Low core habitat & potential of exotics & pets)	High (depends on proximity to core habitat)	High→ Moderate (most likely will not add much core habitat)	Moderate (could reduce risk significantly depending on access & habitat traits)s	Low (could further reduce risk significantly depending on access & habitat trait)	Low Low High High
Wildlife mammals	High (Low core habitat & potential of exotics & pets)	Moderate →Low (depends on adjacency & proximity to core habitat)	Moderate (don't expect that much improvement)	Moderate (could reduce risk significantly depending on access & habitat traits)s	Low (could further reduce risk significantly depending on access & habitat trait)	Low Low High High

Core Habitat

Amphibians = minimum of 5 acres forested land

Reptiles = 5 acres grasslands & other open areas

Birds = 104 ac (forest birds), or minimum rural landcover >=60%

Mammals = 5 ac small mammals, > 5 ac medium & large mammals

Groundwater

In general, short-term potential risk, associated with changes to the wetland protection measures to groundwater interchange functions, most likely will be considered low. Impacts would be small, incremental, and cumulative, and therefore not be a dramatic risk within the five-year short-term period. Exceptions could exist; especially if wetland and watershed conditions are

exacerbated by dramatic weather (e.g., drought) and vegetation cover (e.g., fire) conditions. Over the long-term (i.e., 25-year) period the potential risk of adverse impacts to groundwater functions within urban areas (and other developed areas) would be high as smaller incremental changes accumulate. In contrast, the potential risk in rural areas would be low, as high-density developments and land conversions are discouraged and the 65 percent retention of forest cover grows towards the mature hydrologic condition stage. Furthermore, mitigation and incentive programs encouraging wetland protection and groundwater infiltration within watersheds may reduce risk.

Water Quality Enhancement

The water quality enhancement of wetlands is attributable to groundwater interaction, hydrological characteristics, wetland and buffer vegetation, and land cover practices within the watershed. The potential risk to hydrologic and groundwater that influence water quality enhancement are discussed above. Both groundwater and associated dissolved compounds such as nitrates are influenced by buffer width and vegetation cover with infiltration through the root zone of vegetated 100-ft buffers along level terrain removing most (90 percent) of the nitrates. In general, on level terrain with dispersed flows and a mixed vegetation cover, BAS indicates that most nutrients may be taken up within the CAO proposed 100-300 ft buffers in rural areas, thereby significantly reducing most, if not all, potential risk. Higher risk would be present in the urban areas with the smaller buffer width standard. Pathogens and other dissolved compounds (e.g., metals or organic compounds) may require a buffer larger than the 300 ft. proposed by the CAO for Category I wetland. They still pose a small potential risk that can result in noxious algal blooms and be directly harmful to fish, wildlife, and possibly humans. Clearly, these risks would increase with decreasing wetland rating. Consequently, the wetlands in urban areas, and especially those within or adjacent to affordable housing developments, would receive the highest levels of pollutants while simultaneously exhibiting some of the lowest abilities in processing pollutants. Polluted water also increases the risk of invasion and increase in numbers of harmful insects (e.g., mosquitoes, blackflies, and others) which in turn may pose a risk to humans. Risk would therefore be cumulative with time. In rural areas, sedimentation and concentrations of pollutants may be expected to be low, and where native extensive vegetation still exists, the proposed buffers most likely reduce potential risk to the water quality enhancement function. In unincorporated Urban Growth Areas this may not be the case, as pollutants may be more concentrated, and quantities may surpass the buffers' capabilities and not completely remove pollutants.

Vegetation, Habitat, and Wildlife

The fixed buffer approach affording wider buffers in rural areas than those presently required by King County may provide additional breeding and cover habitat for wildlife entirely restricted to the aquatic environment and species with home ranges covered by the proposed buffers. However, these buffers may have limited success in protecting semi-aquatic and terrestrial invertebrates and wildlife with larger home ranges and dispersal needs (see BAS, Volume I, Chapter 9: Wetlands, Wetland Fauna and Habitat Section).

The potential risk to habitat and wildlife may be most affected by the fixed-buffers proposed by the CAO because buffers may provide the only wildlife habitat remaining adjacent to wetlands. Clearly, wetland wildlife may be at risk to the extent that wetland hydrology, ground water, and

water quality improvement functions are at risk. More directly, there may be little potential risk to overall wetland wildlife that is totally constrained to individual wetlands other than species using small isolated wetlands which remain unprotected by the proposed CAO. The risk to select species and populations that require more than just wetlands and their immediate buffers are under high risk by fragmentation as development and other human activities engulf and isolate the wetlands from each other and destroy linkages to upland habitats. The proposed CAO new wetland categorization, specifically identification of wetland complexes, may reduce this potential risk by providing the necessary connections and habitats between several wetlands in close proximity, although it may not protect connections to essential upland habitat. However, the risk of wildlife extinction associated with barriers to upland habitats, is being addressed through the proposed CAO's incentive program hoping to join wetlands to other critical areas.

In protecting wildlife functions the minimum critical size and ecosystem areas required to preserve their characteristic species diversity and composition remain largely unknown. It becomes necessary to understand individual species behavior and movements, home ranges, and other patterns of foraging, hibernation, etc. For example, inadequate protection for noise sensitive wildlife or those species that rely on vocalizations for communication (establishing territories, mate selection, warning of young, etc.) may result from inadequate buffers surrounding wetlands or inadequate corridor widths. Sudden, loud noises are known to disturb patterns or otherwise cause stress, although some wildlife may habituate to these conditions. Unfortunately, the response of wildlife to these various aspects of wetland, buffer, and landscape condition are highly variable and species and individual dependent, and therefore it is difficult to assess the adequacy of buffer widths. Nevertheless, for most wildlife larger buffers offer a commensurate greater certainty of protection.

The proposed CAO also does not directly address the concerns of BAS regarding the threat of invasive species, a major threat to wetland wildlife, and other functions (Desbonnet et al. 1994). Invasive species may, in part, be controlled or managed through other wetland and landscape regulations and practices although their dispersal may be better controlled through management of underlying processes as suggested by BAS.

Overall inconsistencies of the CAO with BAS would most likely and most seriously effect functions in unincorporated urban (possible industrial, commercial and urban residential) areas. Low overall potential risk is projected for rural lands (residential, agriculture, forest lands) were most habitats may remain connected to each other because of the low level of development and other land use practices.

The sensitivity of wildlife to wetland isolation and overall habitat fragmentation (i.e., loss of wildlife species and declines in populations) may not be reflected in declining wetland associated wildlife within the short-term (i.e., five-year) period, although they could occur at outwardly unrecognized levels (e.g., genetic levels). Outwardly identifiable wildlife impacts could be high over the long term (i.e., twenty-five-year), although potential risks are dependent on wildlife population size (larger population may show proportionately less decline), individual taxa traits (terrestrial Vs aerial dispersal), wetland functions (hydrological, water quality and food chain support), and other criteria. Regardless, because of the interdependence of functions, the potential effects on wildlife may have a longer lag time than that occurring to other functions.

6.9 FINAL CONCLUSION

In development of the Critical Areas Ordinance, King County was guided by the Growth Management Act provision regarding the use of Best Available Science. The appropriate RCW section is provided below:

RCW 36.70A.172 Critical areas—Designation and protection—Best available science to be used.

> (1) In designating and protecting critical areas under this chapter, counties and cities shall include the best available science in developing policies and development regulations to protect the functions and values of critical areas. In addition, counties and cities shall give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries.
>
> (2) If it determines that advice from scientific or other experts is necessary or will be of substantial assistance in reaching its decision, a growth management hearings board may retain scientific or other expert advice to assist in reviewing a petition under RCW 36.70A.290 that involves critical areas. [1995 c 347 § 105.]

In addition to the provisions found in the RCW, King County was guided by the Washington Administrative Code (WAC) (see discussions in Volume I Chapter I and Volume II Chapter II) and in particular, the following section:

> **WAC 365-195-915 Criteria for including the best available science in developing policies and development regulations.**
>
> (1) To demonstrate that the best available science has been included in the development of critical areas policies and regulations, counties and cities should address each of the following on the record:
>
> (a) The specific policies and development regulations adopted to protect the functions and values of the critical areas at issue.
>
> (b) The relevant sources of best available scientific information included in the decision-making.
>
> (c) Any nonscientific information—including legal, social, cultural, economic, and political information—used as a basis for critical area policies and regulations that depart from recommendations derived from the best available science.
>
> A county or city departing from science-based recommendations should:
>
> (i) Identify the information in the record that supports its decision to depart from science-based recommendations;
>
> (ii) Explain its rationale for departing from science based recommendations; and
>
> (iii) Identify potential risks to the functions and values of the critical area or areas at issue and any additional measures chosen to limit such risks. State

Environmental Policy Act (SEPA) review often provides an opportunity to establish and publish the record of this assessment.

(2) Counties and cities should include the best available science in determining whether to grant applications for administrative variances and exemptions from generally applicable provisions in policies and development regulations adopted to protect the functions and values of critical areas. Counties and cities should adopt procedures and criteria to ensure that the best available science is included in every review of an application for an administrative variance or exemption.

In developing its proposed standards, King County sought consistency with Best Available Science (BAS) while balancing the other County obligations and goals. The King County standards fell primarily in the middle range of BAS recommendations with five departures. Where the standards are not fully supported by best available science, the standards are the result of a balancing of the County's other Growth Management Act (GMA) obligations and goals (see BAS Volume II, Chapter 1).

In conclusion, King County's Best Available Science reports, Volumes I: A Review of Science Literature and Volume II: Assessment of Proposed Ordinances provide the documentation on best available science and the method that King County followed to meet State and County requirements for critical areas protection.

6.10 REFERENCES

Overview of the Growth Management Act: Growth Management Services

Washington Department of Trade and Community Development, 2003.