

City of Carnation Programmatic Habitat Assessment

**Demystifying National Flood Insurance
Program Alignment with the Endangered
Species Act**

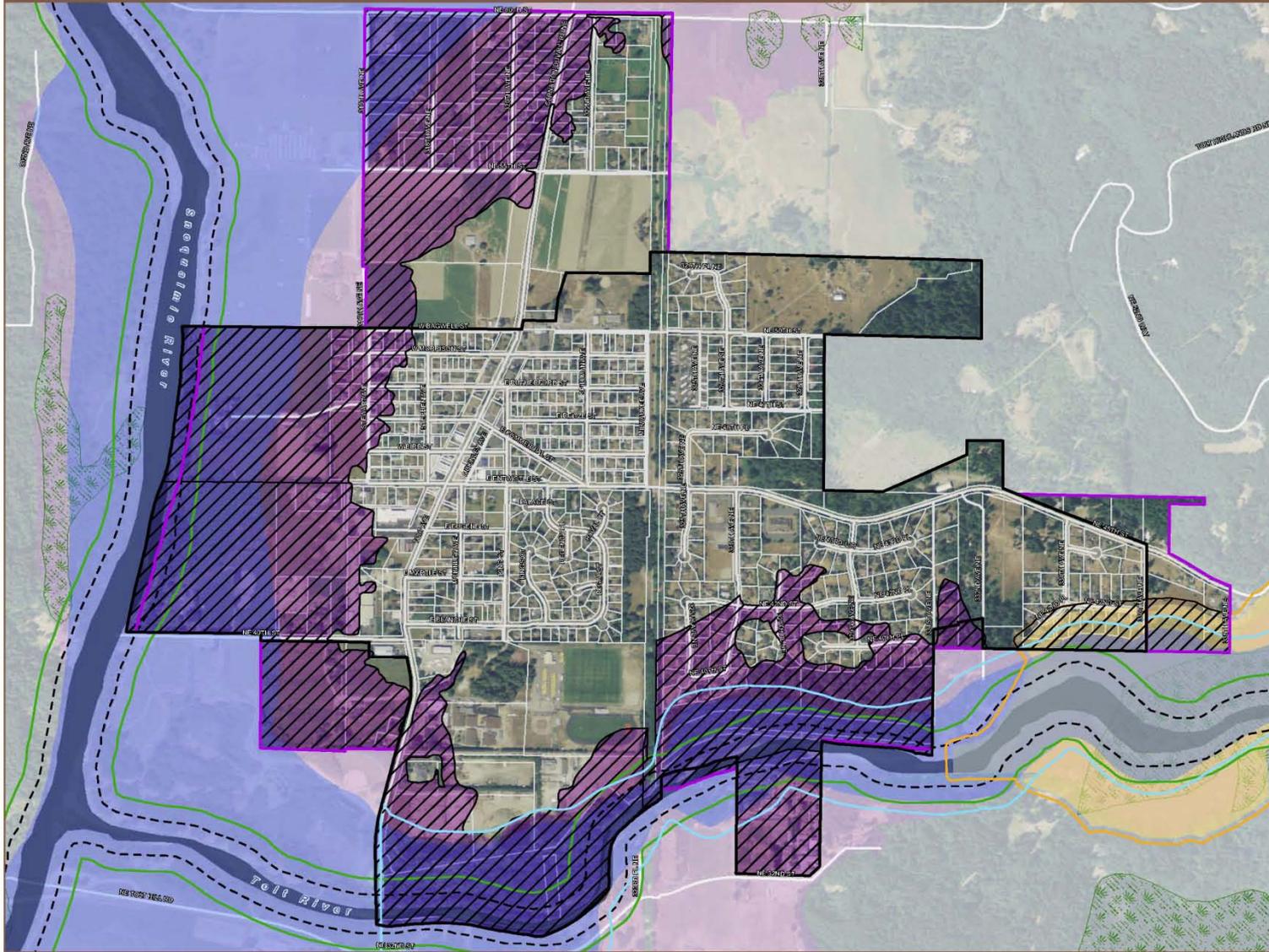
March 2, 2011



Carnation is...

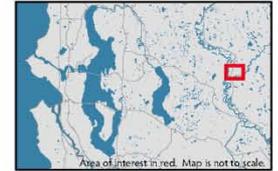
- At the confluence of the Tolt and Snoqualmie Rivers in the lower Snoqualmie River Valley (WRIA 7)
- A small city
 - 1.1 mile UGA (0.05% of WRIA 7, 0.14% the Snoqualmie watershed and less than 1% of the Tolt watershed)
 - current population 2,000
 - build-out population 4,000
- Approximately 340 acres (40%) in flood hazard area (floodplain, floodway and CMZ)

OVERVIEW OF ASSESSMENT AREA



CITY OF CARNATION PROGRAMMATIC FLOODPLAIN HABITAT ASSESSMENT

D R A F T



MAP LEGEND

- Floodway ²
- Floodplain ²
- Wetlands ²
- Channel Mitigation Hazard Area (CMHA) ²
- 50' CMHA Setback ³
- 100' Tolt River Setback ¹
- 115' Stream Buffer ³
- 250' Riparian Habitat Zone ³
- Protected Area ³
- City Boundary
- Urban Growth Area

Date: February 22, 2011

Data source:

¹ Roth Hill, LLC; ² King County GIS Department;

³ The Watershed Company (TWC)



Note: Base map and all features are projected from GIS data available from source(s) listed above. TWC has no warranties for any materials and is not liable for any errors or omissions.

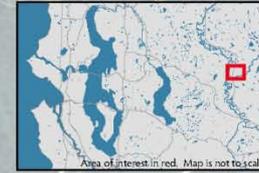
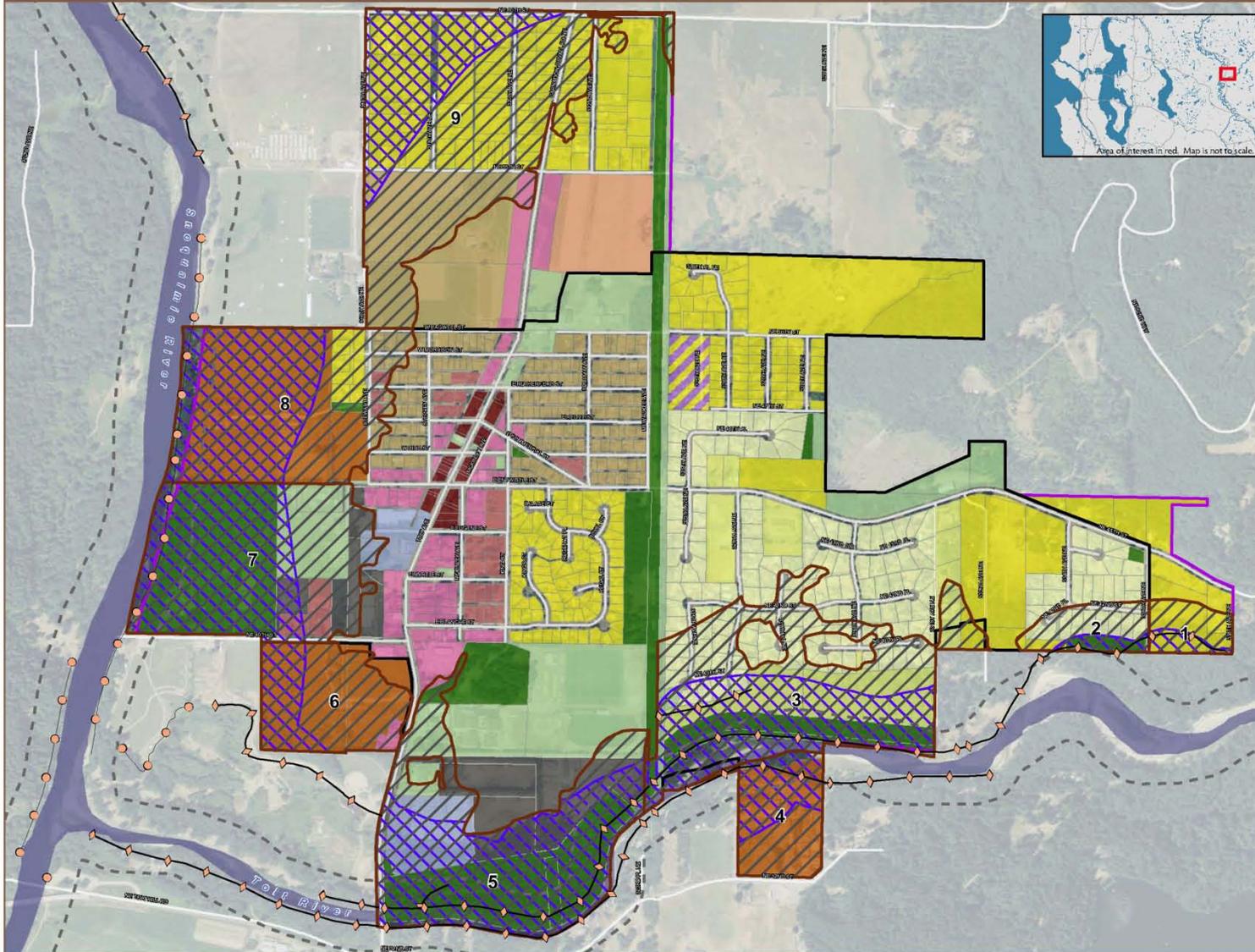
Riparian Buffer Zone (RBZ)

- No Disturbance Area
- Furthest landward of
 - Floodway
 - CMZ
 - Riparian habitat zone
- Floodway defines the RBZ for Carnation, except for a small area of CMZ
 - Approx. 134 acres in floodway
 - Approx. 15 acres in CMZ + 50' buffer
- Existing City codes already provide no disturbance in the RBZ
 - Section 15.88.500 CMC Fish and wildlife habitat conservation areas (includes 100' buffer from floodway on the Tolt)
 - Section 15.64.040 CMC restricts development in floodway per NFIP minimum standards

SFHA outside the RBZ

- 100 year floodplain outside the RBZ
 - 193 acres; 70 acres in Parks or Open Space
 - 53% of City's industrial acreage
 - +/-750 to 1,000 feet from OHWM for Snoqualmie
 - +/-500 feet from OHWM for Tolt
- Existing City codes meet NFIP for safety but do not meet the minimum requirements of the BiOp. Development is currently allowed with a floodplain permit.

OVERVIEW OF PROTECTED AREA AND SUB-AREAS



CITY OF CARNATION PROGRAMMATIC FLOODPLAIN HABITAT ASSESSMENT

D R A F T



MAP LEGEND

- Levees ²
- Revetments ²
- 250' Riparian Habitat Zone ³
- Protected Area ³
- Proposed Shoreline Jurisdiction ³
- City Boundary
- Urban Growth Area
- City Proposed Zoning ¹**
- R2.5, Residential 2.5
- R3, Residential 3
- R4, Residential 4
- R6, Residential 6
- R12, Residential 12
- R24, Residential 24
- RMHP, Residential Mobile Home Park
- CBD, Central Business District
- SC, Service Commercial
- MU, Mixed Use
- LI/M, Light Industrial / Manufacturing
- HC, Horticultural Commercial
- PU, Public Use
- PR, Parks

Date: February 22, 2011
 Data source: ¹ Roth Hill, LLC; ² King County GIS Department; ³ The Watershed Company (TWC)



Note: Base map and all features are projected from GIS data available from source(s) listed above. TWC has no warranties for any materials and is not liable for any errors or omissions.

City objectives

- Economic development is essential to Carnation's future. Two objectives:
 1. Encourage local job growth through zoning, infrastructure investment and (possibly) developing facility for incubator industries, and
 2. Protect and enhance local habitat to promote visitors to parks and trails who will also patronize local businesses.

Why should Carnation do a City-wide Habitat Assessment?

- City wants to use Door #2 to streamline permitting process
 - ❖ Will need to amend development regulations to meet new minimum requirements of the NFIP
 - ❖ Programmatic approach would assist developers by identifying habitat and mitigation up front
- There may be opportunities to enhance habitat areas on public lands that would offset impacts of development elsewhere in the floodplain

We get by with a little help from our friends....*

- Technical assistance for habitat evaluation from King County Water and Lands staff.
This was essential to the City's decision to do the Programmatic Habitat Assessment.
- Mapping by The Watershed Company (GIS map folio already in development for Shoreline Master Plan Update).
- Otherwise, document is being done in-house

* With apologies to the Beatles



A short tutorial on Floodplain Habitat for Chinook Salmon

“Habitat for Non-Biologists”



Salmon are adapted to take advantage of floodplain complexity

- When inundation occurs, young salmon use floodplains for feeding and refuge
- Floodplains are more biologically productive than mainstems, and salmon who have access to floodplains grow more rapidly
- Floods provide increased diversity of foods:
 - Over time flooding creates small scale habitats with different biota, the “edge effect”
 - Flooding connects these habitats for juvenile fish to access (if the river is a highway, floodplains are a rest stop with a really great diner)

How do fish use the Carnation floodplain?

- Half or more of the Snoqualmie Chinook salmon population spawns in the gravel beds of the lower Tolt and the Snoqualmie downstream of its confluence with the Tolt.
- Rearing habitat for juvenile Chinook is considered the most significant factor limiting the Snoqualmie River Chinook population.
- Eggs and larval fish (alevins or fry) reside for weeks in the gravel beds, and require food.
- Chinook emergence coincides with high winter flows and the flood season

Habitat values in the Carnation floodplain

- The floodway is most frequently flooded and ecologically complex, which increases food and productivity of salmon. In Carnation, floodways generally define the No Disturbance Zone.
- No lentic habitats (side channels, oxbows etc) within Carnation's floodplain outside of the floodway, so the "edge effect" isn't as pronounced when these areas flood. But they do provide refuge and some feeding (fast food as opposed to a great diner).

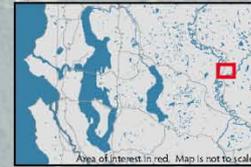
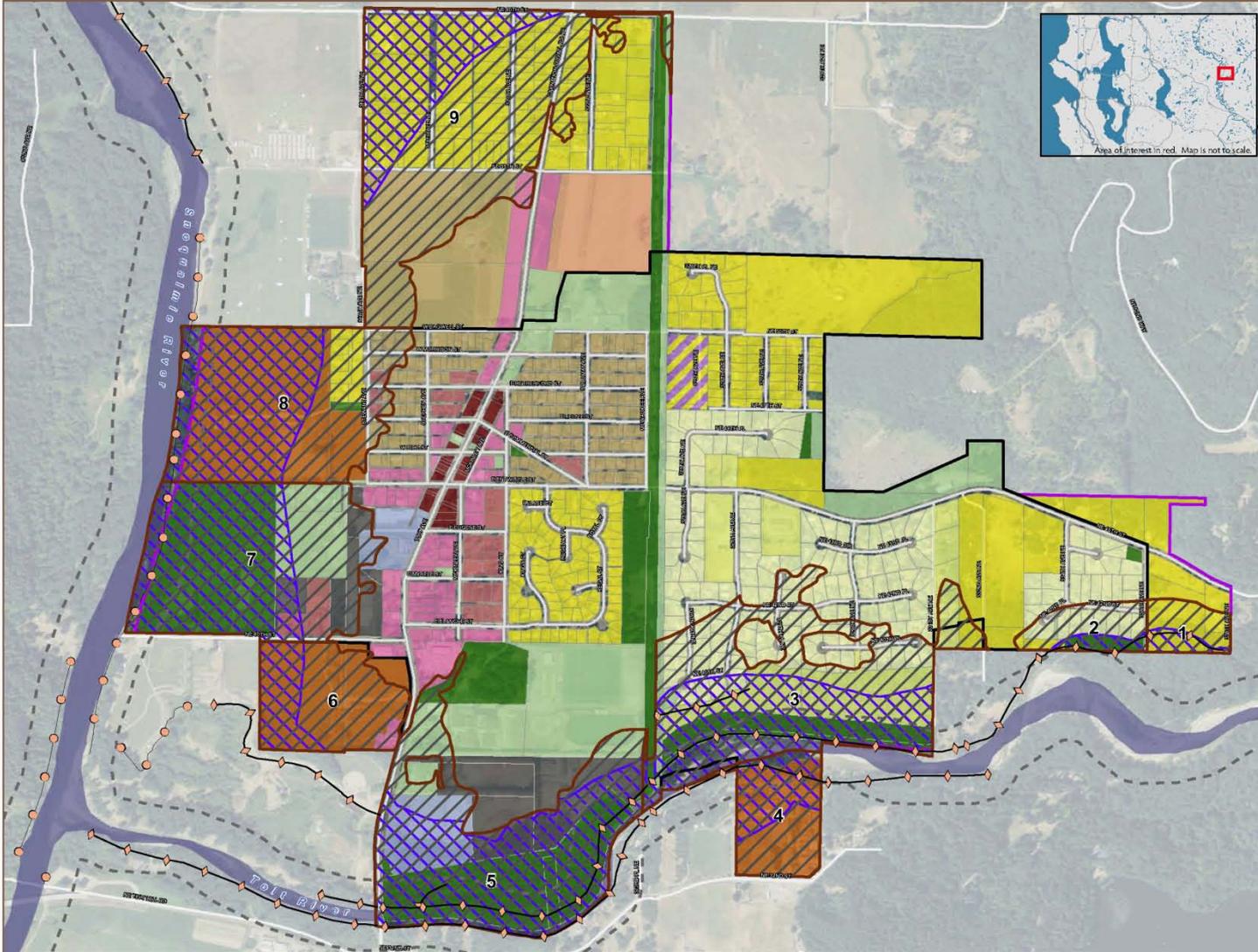
Dikes and Levees limit the ecological value of much of the Tolt River in Carnation

- Built in the 1940's to prevent flooding
- Not Corps certified
- Confine the Tolt to a narrow river bed along the lower 1 - ½ mile within the City

Dikes and Levees limit the ecological value of much of the Tolt River in Carnation

- Built in the 1940's to prevent flooding
- Not Corps certified
- Confine the Tolt to a narrow river bed along the lower 1 - ½ mile within the City

OVERVIEW OF PROTECTED AREA AND SUB-AREAS



CITY OF CARNATION PROGRAMMATIC FLOODPLAIN HABITAT ASSESSMENT

D R A F T



MAP LEGEND

- ◆ Levees ²
- Revetments ²
- ▤ 250' Riparian Habitat Zone ³
- ▨ Protected Area ³
- ▧ Proposed Shoreline Jurisdiction ³
- ▭ City Boundary
- ▭ Urban Growth Area
- City Proposed Zoning ¹
 - R2.5, Residential 2.5
 - R3, Residential 3
 - R4, Residential 4
 - R6, Residential 6
 - R12, Residential 12
 - R24, Residential 24
 - RMHP, Residential Mobile Home Park
 - CBD, Central Business District
 - SC, Service Commercial
 - MU, Mixed Use
 - LI/M, Light Industrial / Manufacturing
 - HC, Horticultural Commercial
 - PU, Public Use
 - PR, Parks

Date: February 22, 2011
 Data source: ¹ Roth Hill, LLC; ² King County GIS Department; ³ The Watershed Company (TWC)



Note: Base map and all features are projected from GIS data available from source(s) listed above. TWC has no warranties for any materials and is not liable for any errors or omissions.

Levee setbacks that reconnect the floodplain to the Rivers create great habitat for Salmon

- A recent project by Seattle Public Utilities and King County set back the levee at the confluence of the Tolt and Snoqualmie (outside City jurisdiction).
- The following picture was taken during the December 2010 flood event.





Understanding the requirements of the BiOp for development in the floodplain outside the RBZ



From Appendix 4 of the BiOp

- Stormwater – volumes of runoff must reach the river at the same frequency, timing and duration as historical runoff. LID is required (infiltration on site)
- Maintain or replace riparian vegetation function
- Minimize bank stabilization
- No activity that limits the CMZ
- No activity that interferes with the natural exchange of flow between surface water, groundwater and the Hyporheic zone
- Maintain wetlands
- Any LWD removed must be replaced

Appendix 4: specific requirements

- Structures out of the floodplain if possible, or to be as far landward as possible
- Orient structures parallel to flow rather than perpendicular
- Structures must be 15' from the RBZ
- Low density zoning (5 acre lots or greater)
- Creation of new impervious surfaces cannot exceed 10% of lot area unless mitigation is provided
- 65% of surface area of the lot must remain in native vegetation (RBZ included in the calculation)
- Notice on Title required
- New road crossings over streams are prohibited
- Clustering, density transfers, etc. encouraged

Carnation's Programmatic Habitat Assessment

- The floodplain area within the UGA is divided into 9 sub-areas, based on Shoreline Reaches from the SMP, but extended landward to include the 100 year floodplain.
- Following the FEMA Guidance for a Floodplain Habitat Assessment, we will assess each sub-area.

For Sub-areas 1 thru 9

1. Describe Sub-area
2. Describe Habitat
3. Describe potential development using buildable lands analyses (e.g., what is the most intense development possible under the existing regulations)
4. Assess the impacts of the development
5. Mitigation plan (changes to regulations +/- or possible habitat enhancement projects)

Potential mitigation: Overlay zone for development in the floodplain

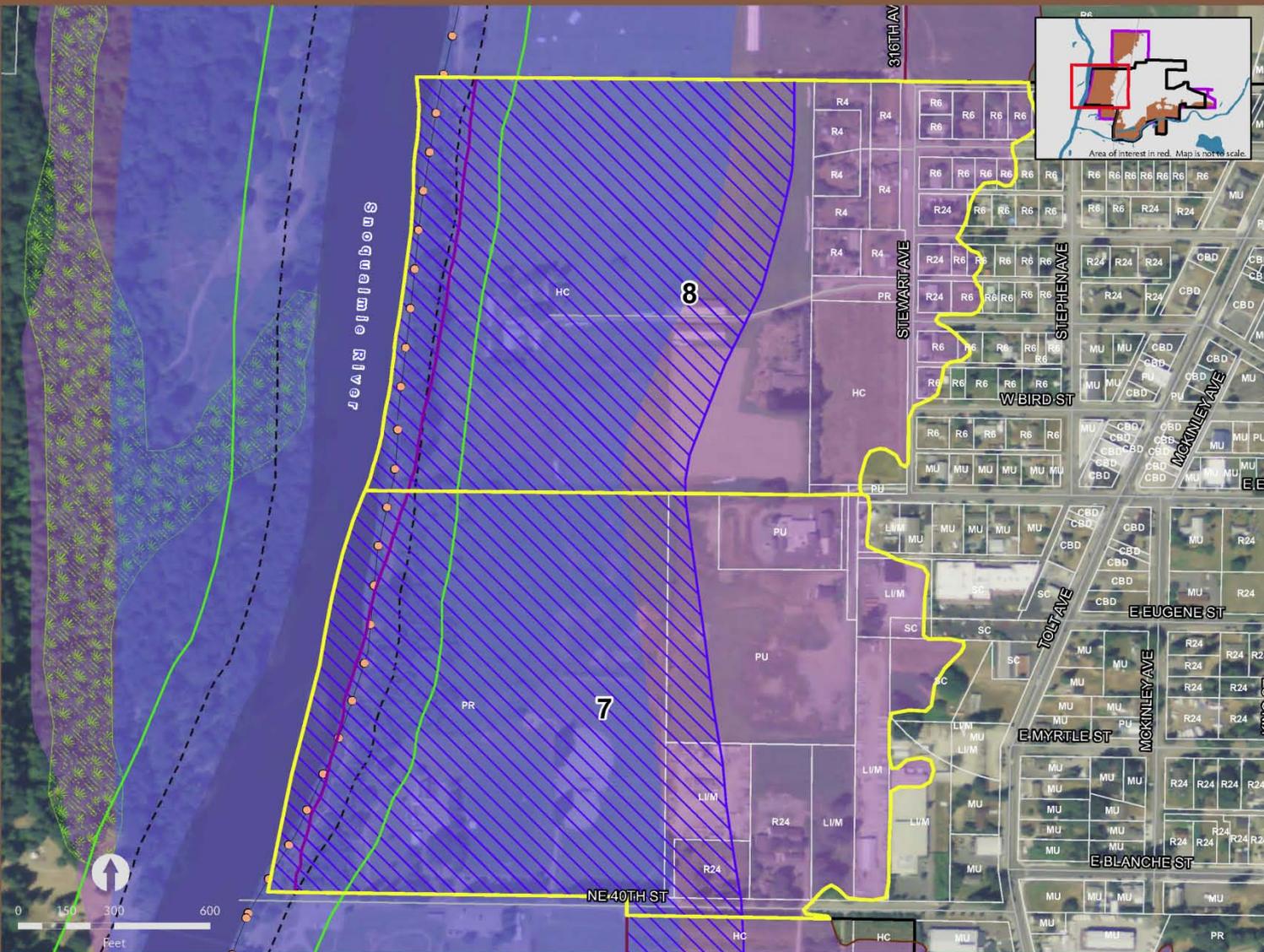
- Potential overlay regulations might include:
 - Limitations on density/intensity allowed by the underlying zone
 - More limitations on impervious surface than allowed in the underlying zone
 - Increased landscaping requirements (native vegetation, shading)
 - Conditions of development from the BiOp such as LID (Carnation already requires on-site infiltration for stormwater)

SUB-AREAS 7 AND 8



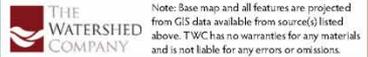
CITY OF CARNATION
PROGRAMMATIC FLOODPLAIN
HABITAT ASSESSMENT

DRAFT



- MAP LEGEND**
- Levees ²
 - Revetments ²
 - Floodway ²
 - Floodplain ²
 - Wetlands ²
 - Channel Mitigation Hazard Area (CMHA) ²
 - 50' CMHA Setback ³
 - 100' Tolt River Setback ¹
 - 115' Stream Buffer ³
 - 250' Riparian Habitat Zone ³
 - Protected Sub-Area ³
 - Proposed Shoreline Jurisdiction ³
 - City Boundary
 - Urban Growth Area
 - City Proposed Zoning ¹
 - R2.5 - Residential 2.5
 - R3 - Residential 3
 - R4 - Residential 4
 - R6 - Residential 6
 - R12 - Residential 12
 - R24 - Residential 24
 - RMHP - Residential Mobile Home Park
 - CBD - Central Business District
 - SC - Service Commercial
 - MU - Mixed Use
 - LI/M - Light Industrial / Manufacturing
 - HC - Horticultural Commercial
 - PU, Public Use
 - PR, Parks

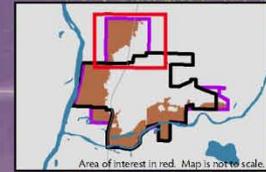
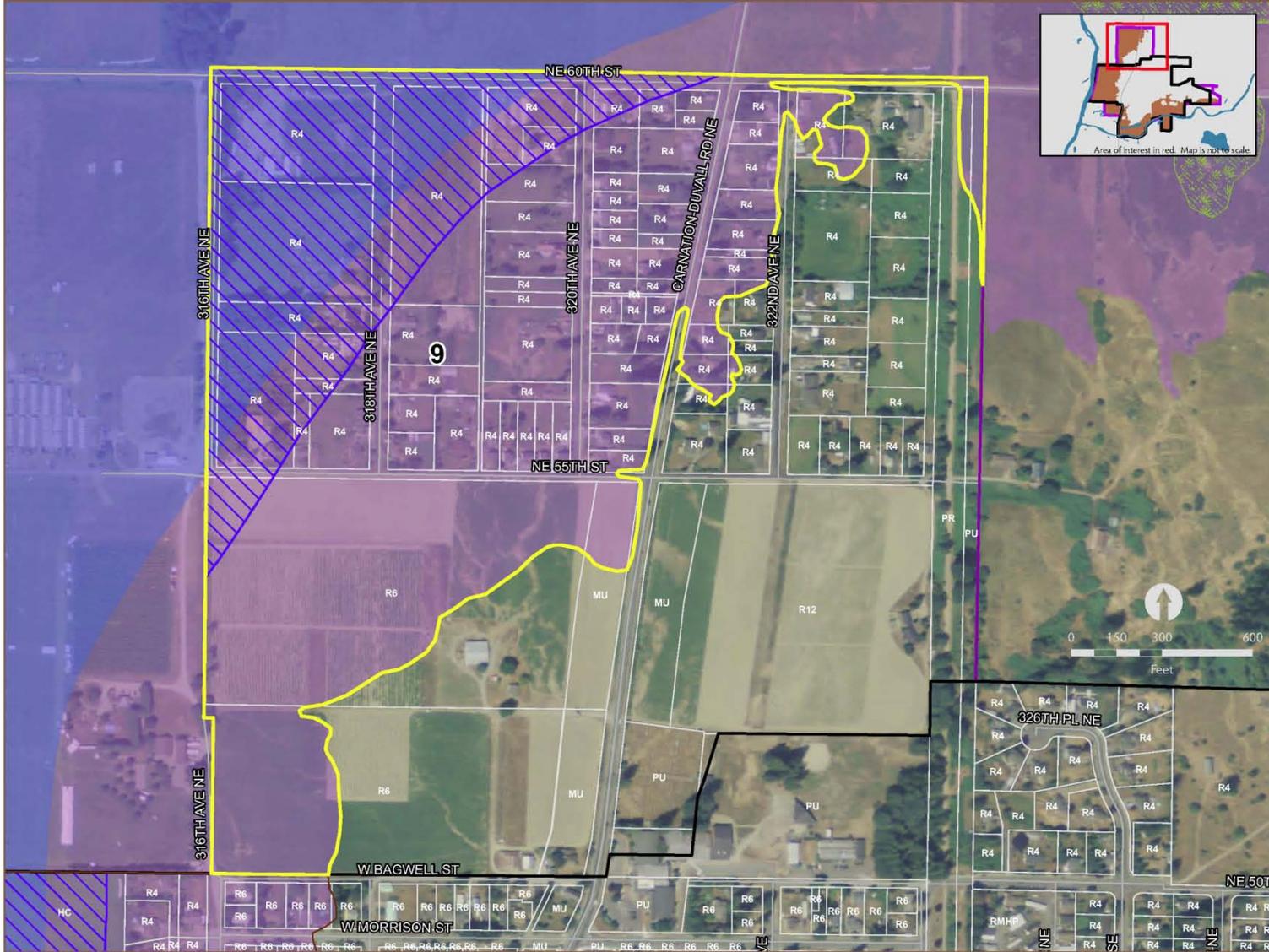
Date: February 22, 2011
Data source: ¹ Roth Hill, LLC; ² King County GIS Department; ³ The Watershed Company (TWC)



Note: Base map and all features are projected from GIS data available from source(s) listed above. TWC has no warranties for any materials and is not liable for any errors or omissions.



SUB-AREA 9




CITY OF CARNATION
PROGRAMMATIC FLOODPLAIN
HABITAT ASSESSMENT
D R A F T

- MAP LEGEND**
- Levees ²
 - Revetments ²
 - Floodway ²
 - Floodplain ²
 - Wetlands ²
 - Channel Mitigation Hazard Area (CMHA) ²
 - 50' CMHA Setback ³
 - 100' Tolt River Setback ¹
 - 115' Stream Buffer ³
 - 250' Riparian Habitat Zone ³
 - Protected Sub-Area ³
 - Proposed Shoreline Jurisdiction ³
 - City Boundary
 - Urban Growth Area
 - City Proposed Zoning ¹**
 - R2.5 - Residential 2.5
 - R3 - Residential 3
 - R4 - Residential 4
 - R6 - Residential 6
 - R12 - Residential 12
 - R24 - Residential 24
 - RMHP - Residential Mobile Home Park
 - CBD - Central Business District
 - SC - Service Commercial
 - MU - Mixed Use
 - LI/M - Light Industrial / Manufacturing
 - HC - Horticultural Commercial
 - PU, Public Use
 - PR, Parks

Date: February 22, 2011
 Data source: ¹ Roth Hill, LLC; ² King County GIS Department; ³ The Watershed Company (TWC)



Note: Base map and all features are projected from GIS data available from source(s) listed above. TWC has no warranties for any materials and is not liable for any errors or omissions.

Potential Mitigation: Habitat Enhancement projects

- Carnation and King County are exploring the feasibility of habitat enhancement on publicly owned lands.
- Potential projects
 - enhancing the floodway adjacent to the Snoqualmie River in Tolt McDonald Park, and/or
 - exploring levee setbacks further upstream on the Tolt.
- Enhancement projects could be used to offset development impacts in the flood fringe.

My contact info

Linda Scott, AICP

City Planner

City of Carnation

425-333-4192

linda@ci.carnation.wa.us