Can turtles and humans coexist?

An examination of the limiting factors of Western painted turtles in Oregon

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Dr. Catherine de Rivera
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Oregon Turtles

Western Painted Turtle

Chrysemys picta bellii

Photo Credit: Oregon Wildlife

Northwestern Pond Turtle

Actinemys marmorata

Photo Credit: ODFW

Oregon Turtles

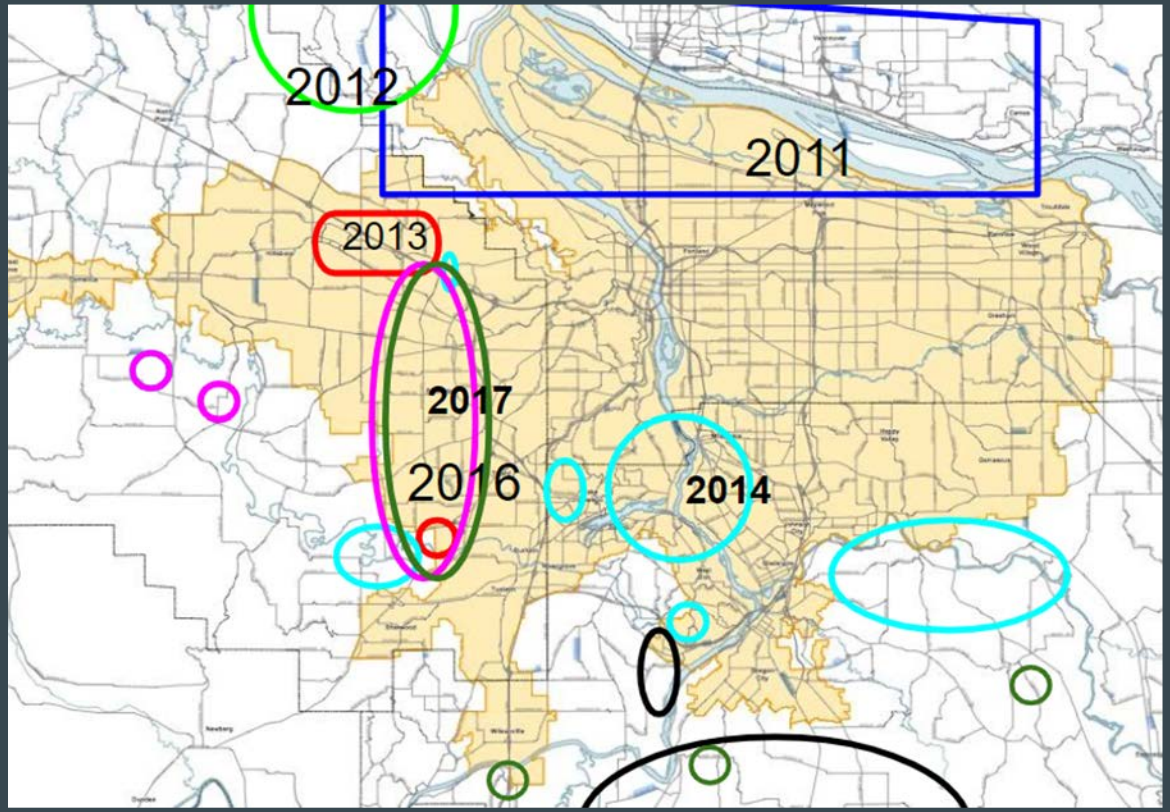
Western Painted Turtle

Chrysemys picta bellii

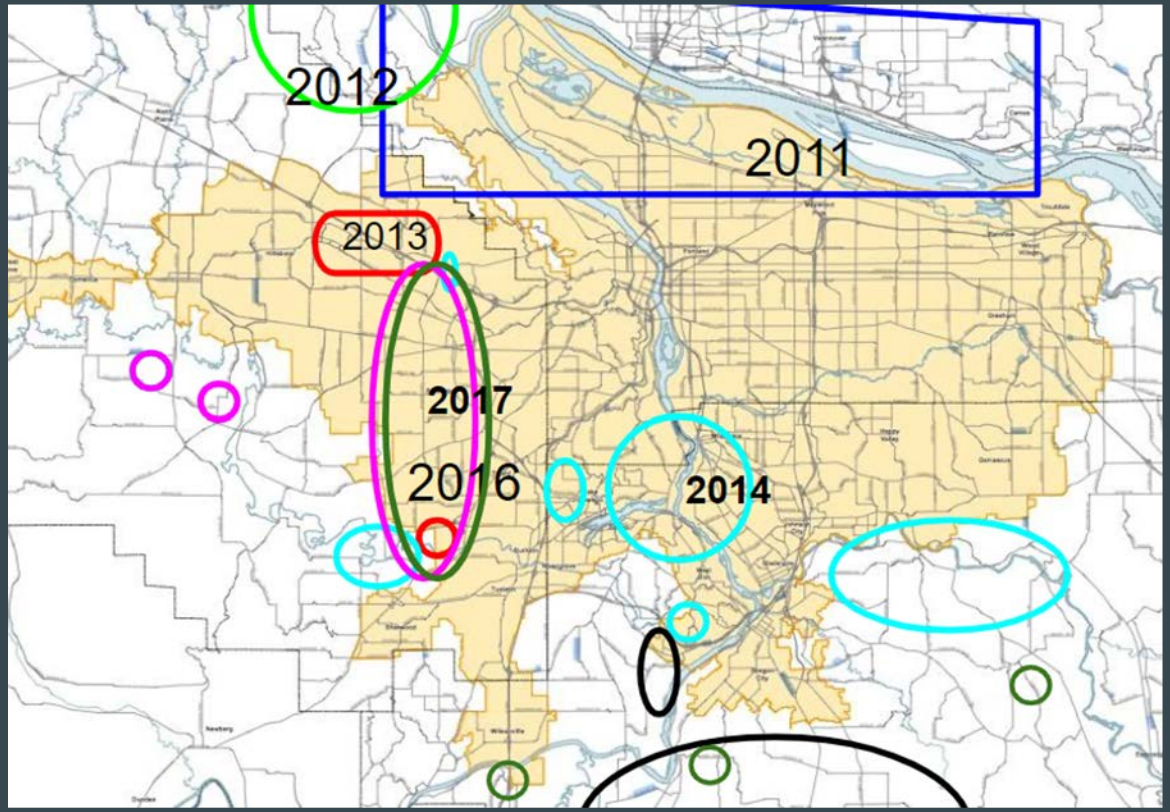
Photo Credit: Oregon Wildlife

- Ectothermic
- Long-lived
- Many less than historic populations

Portland Metro Area Turtle Surveys



Portland Metro Area Turtle Surveys



- 105 sites surveyed over 5 years
- Few juvenile turtles observed

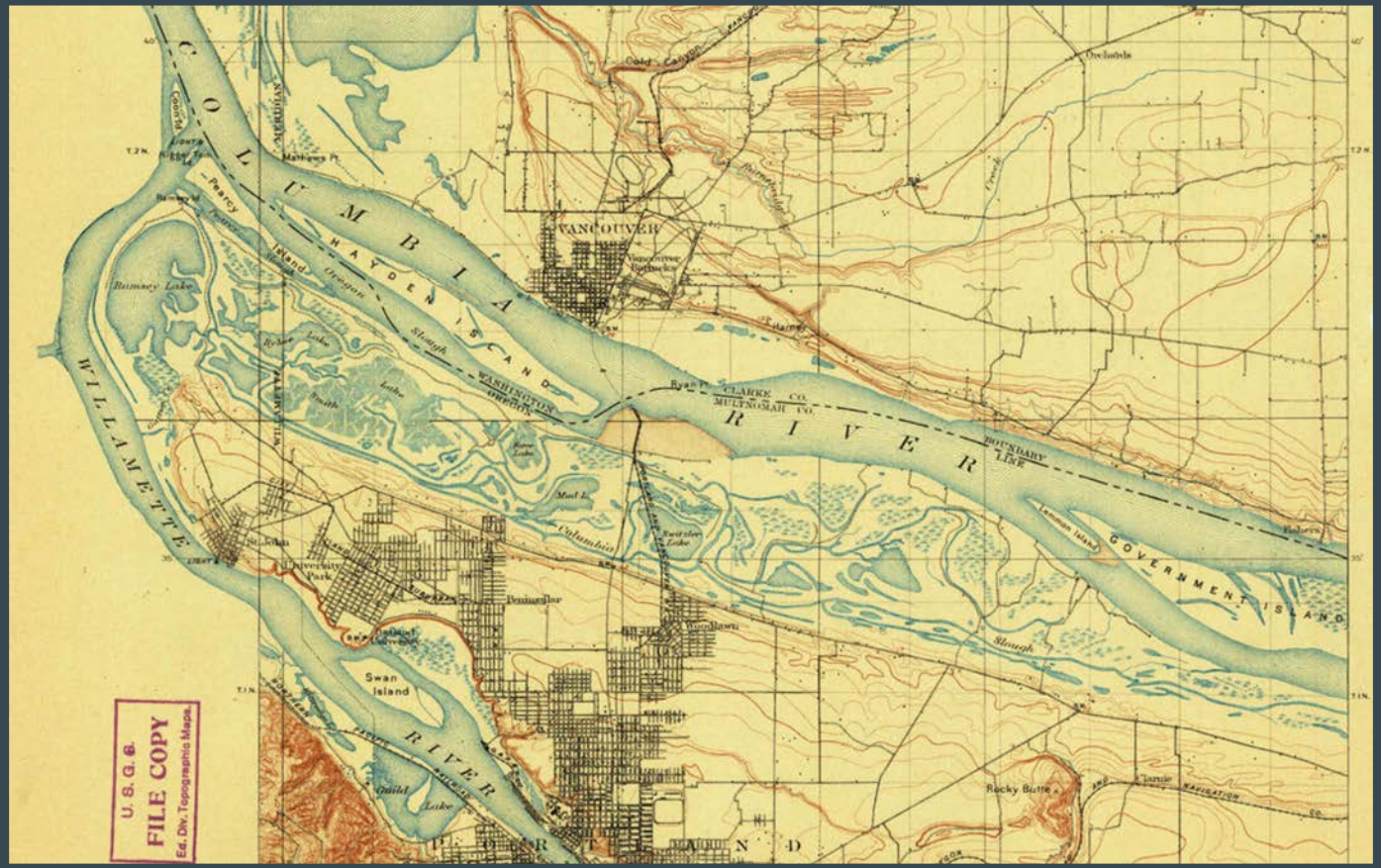
Question:

What are the habitat requirements of *Chrysemys picta bellii*?

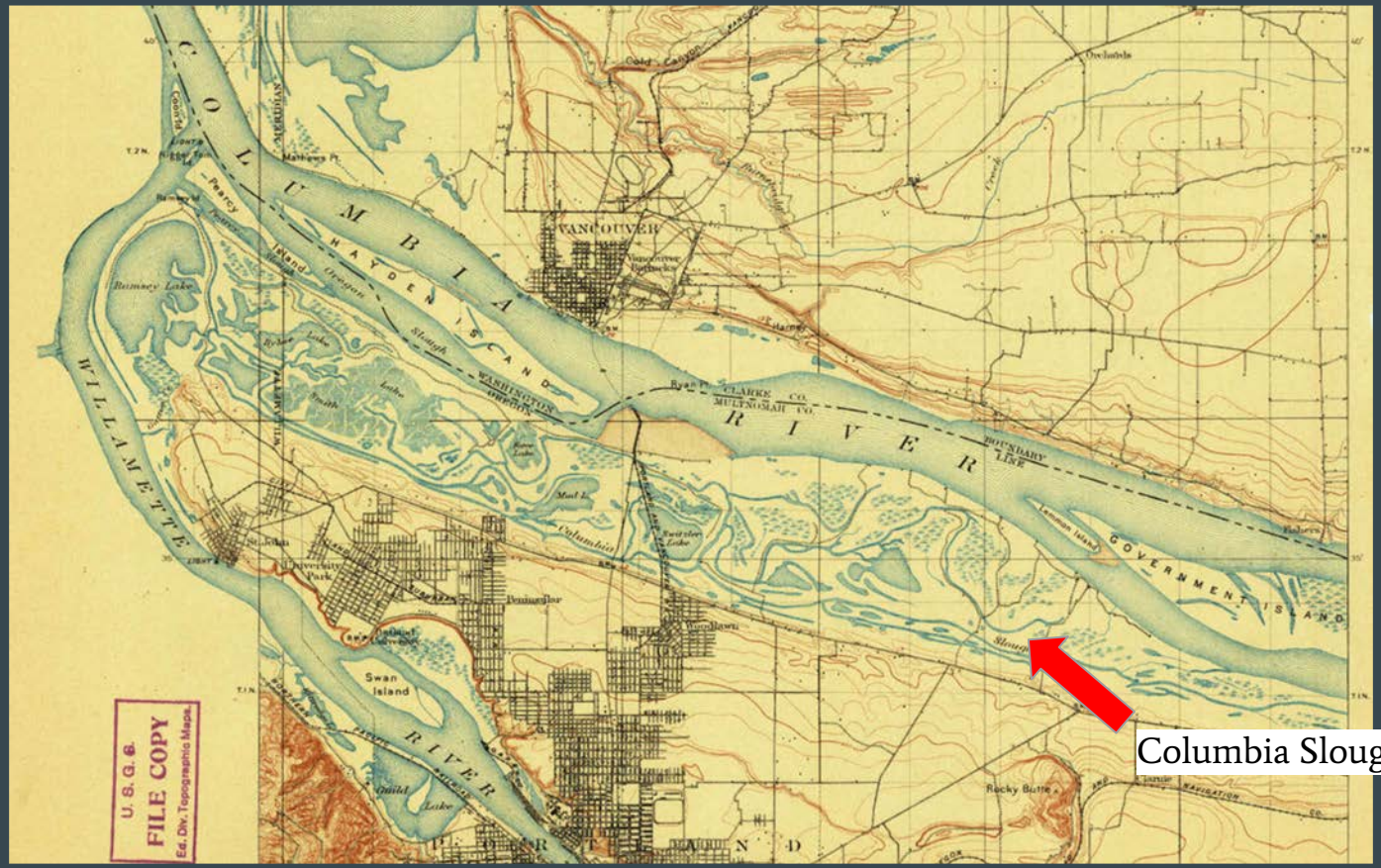
Answers:

1. Basking Structures
2. Aquatic Vegetation
3. Connectivity
4. 40m Buffer or Equivalent
5. Viable Nesting Habitat
6. Juvenile Habitat

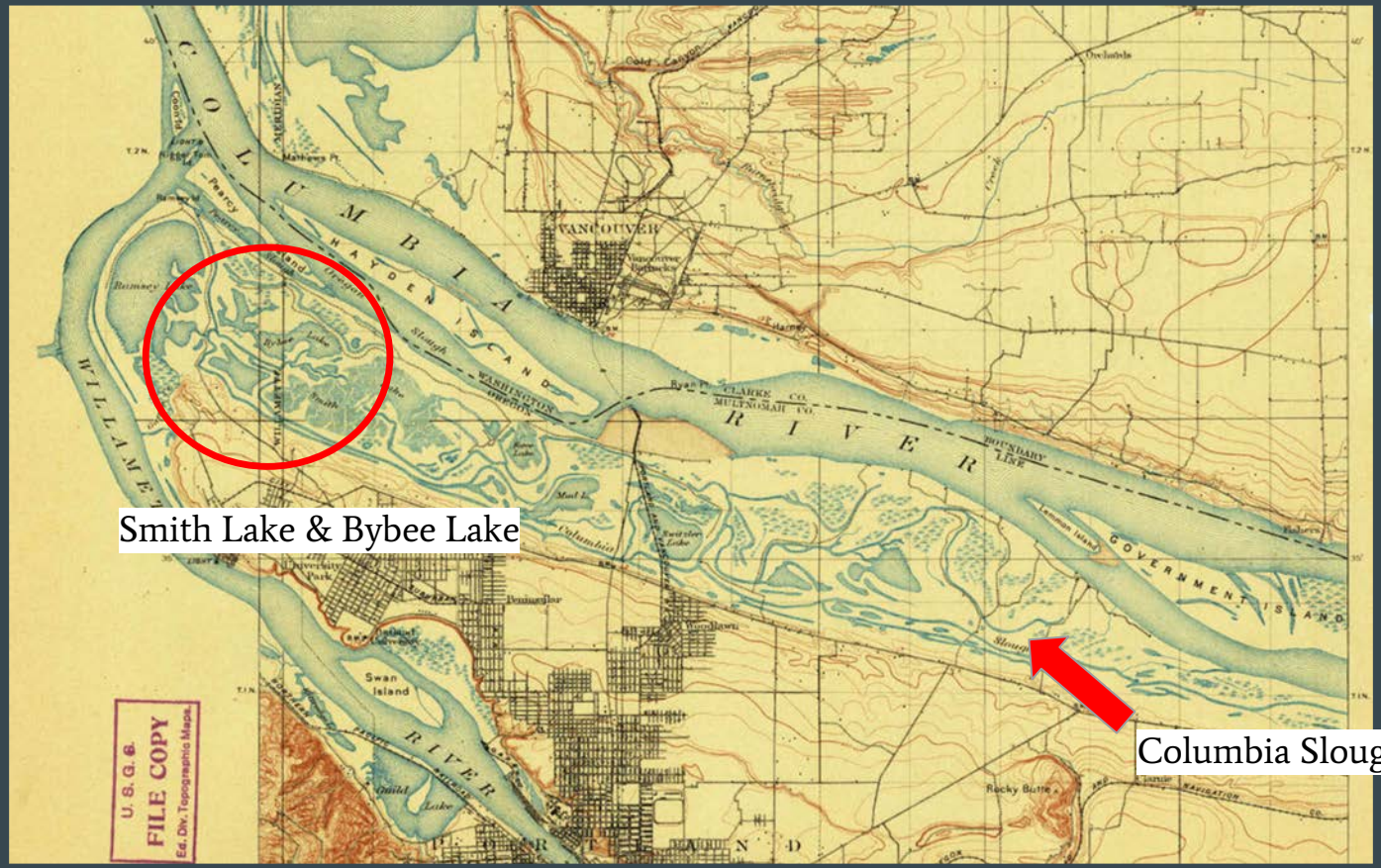
Portland, Oregon 1897



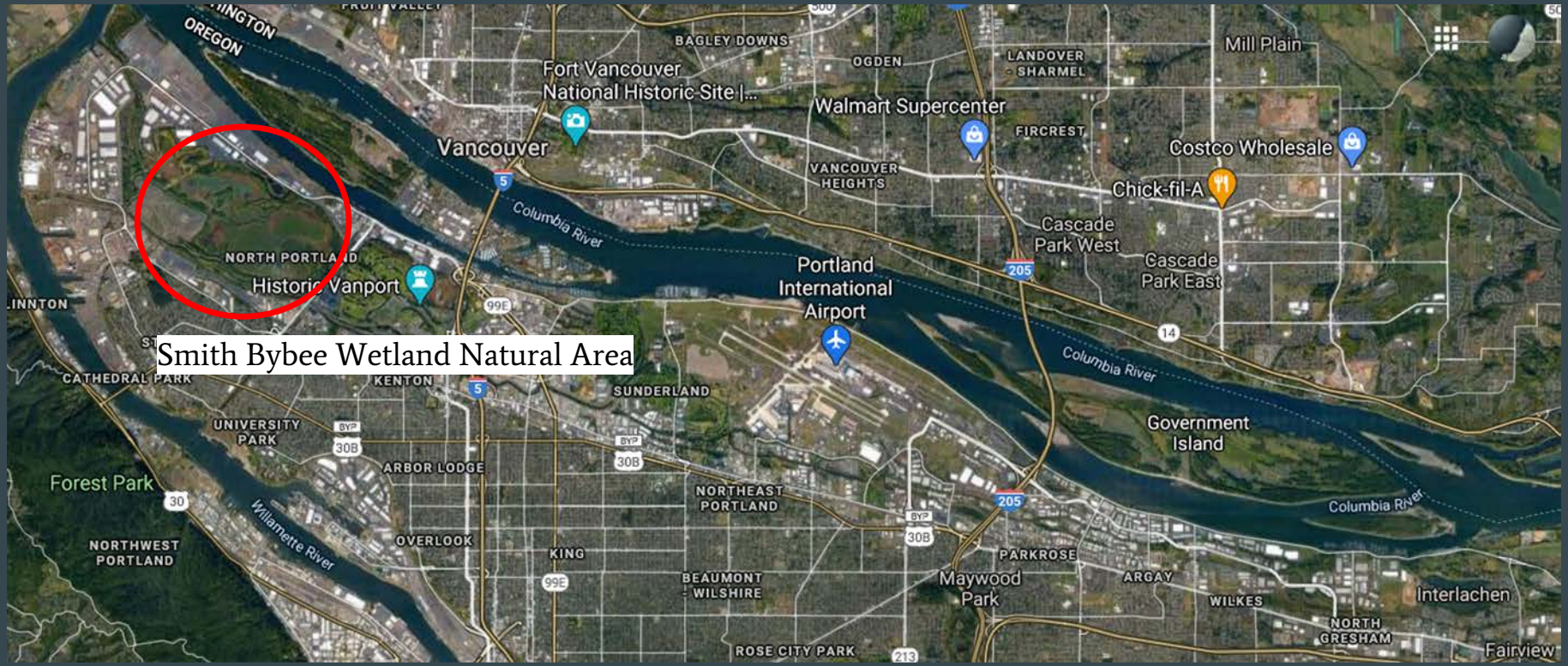
Portland, Oregon 1897



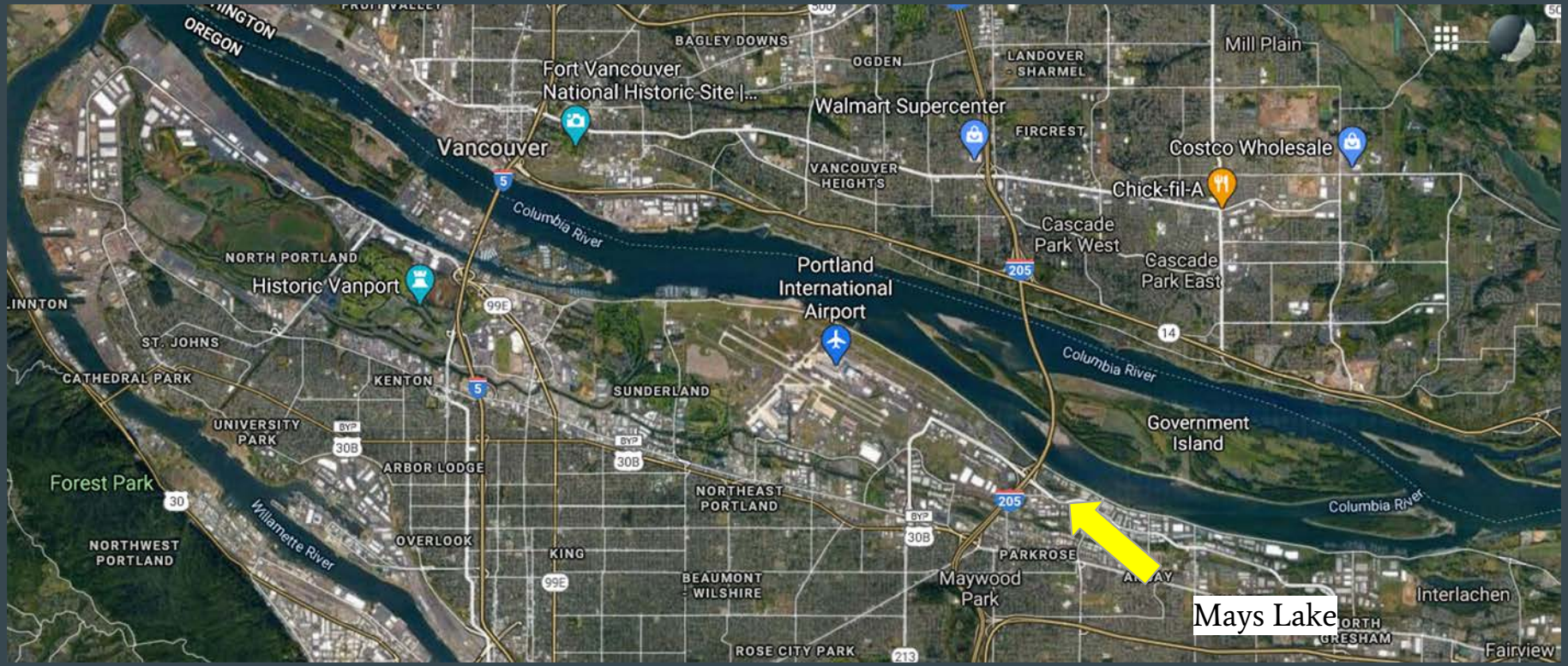
Portland, Oregon 1897



Portland, Oregon 2021



Portland, Oregon 2021



Mays Lake

- ❑ Basking
- ❑ Aquatic Vegetation

Mays Lake

- [x] Basking
- [x] Aquatic Vegetation

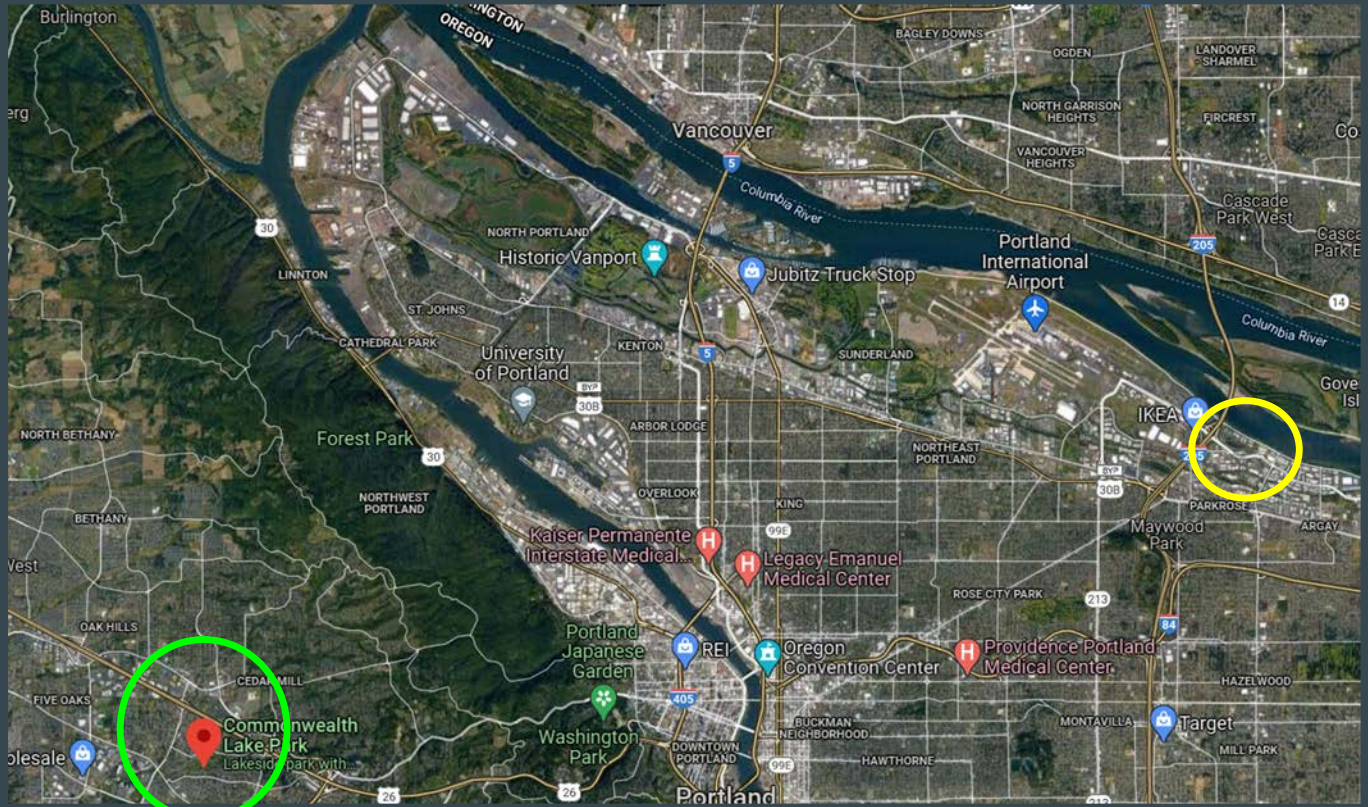
Mays Lake

- ☑ Basking
- ☑ Aquatic Vegetation
- ❑ Connectivity

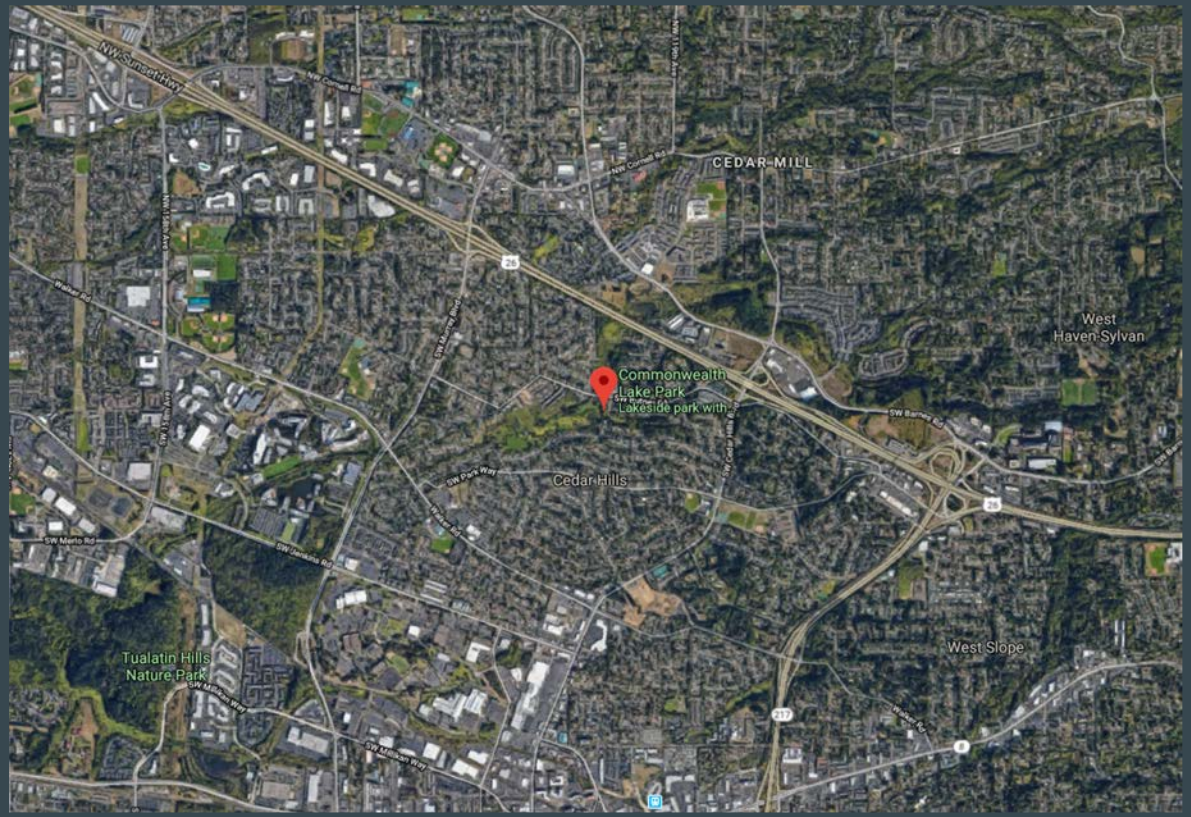
Mays Lake: No turtles observed

- ☑ Basking
- ☑ Aquatic Vegetation
- ☒ Connectivity

Commonwealth Lake Park

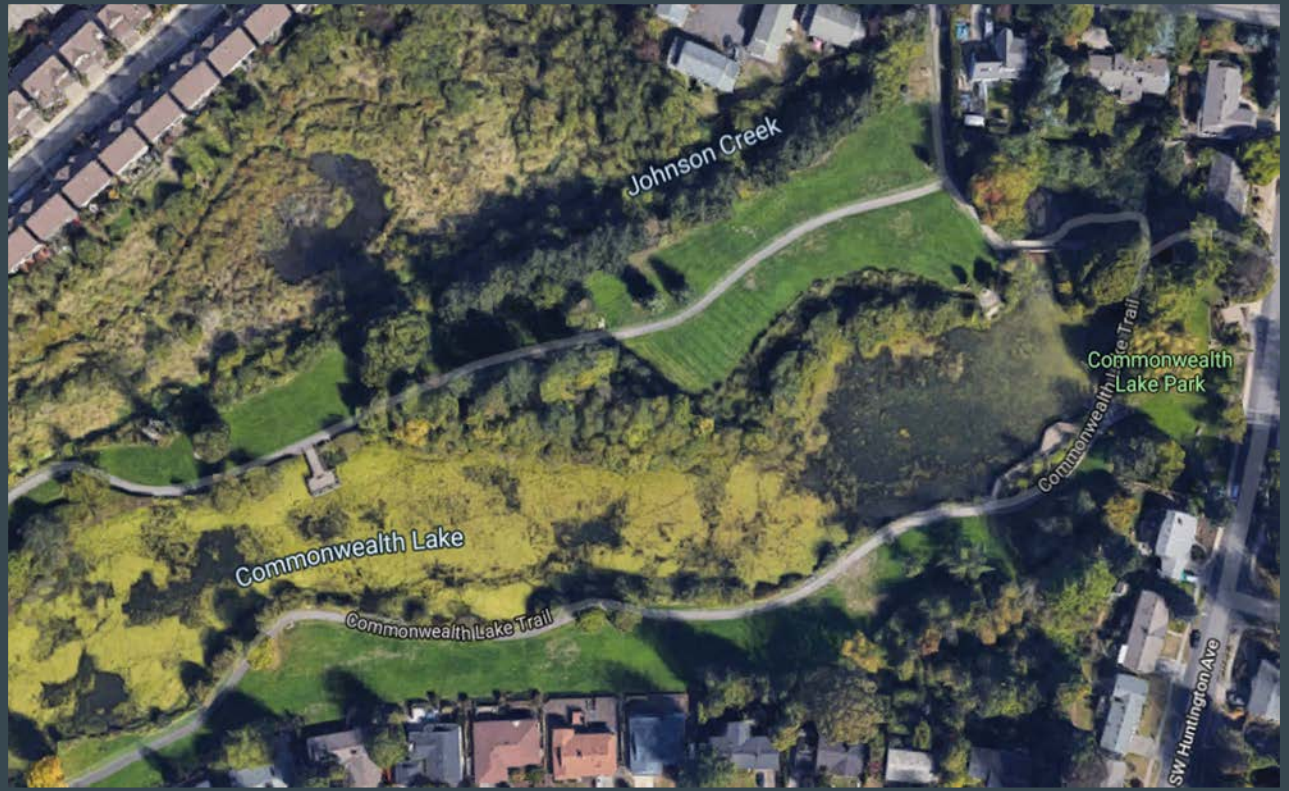


Commonwealth Lake Park



- ❑ Basking
- ❑ Aquatic Vegetation
- ❑ Connectivity

Commonwealth Lake Park



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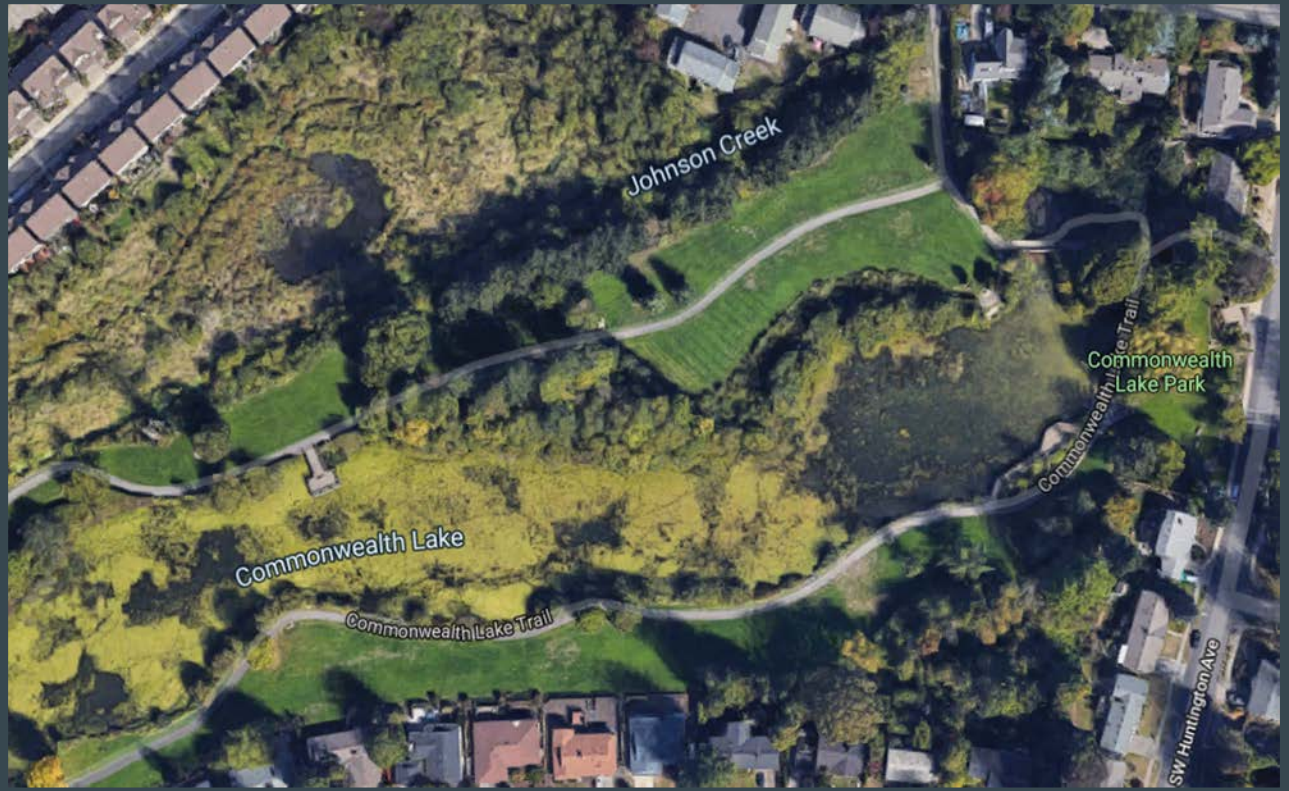

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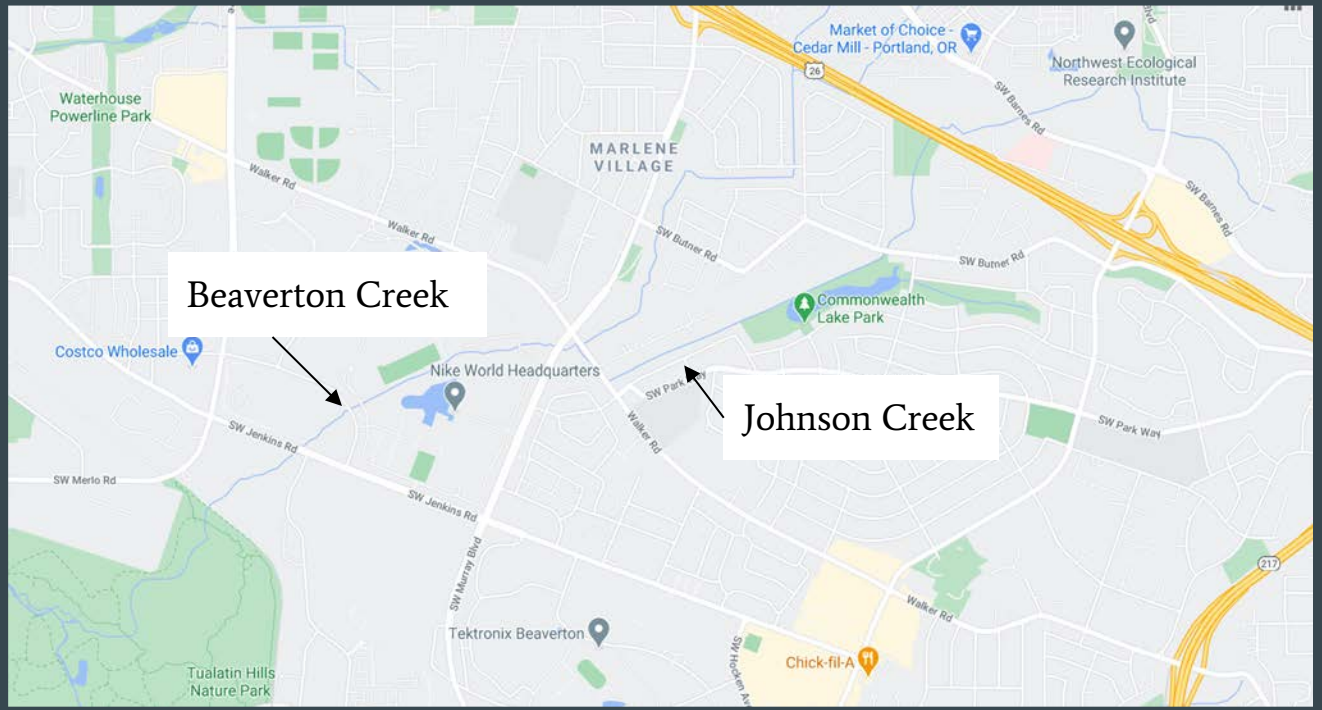
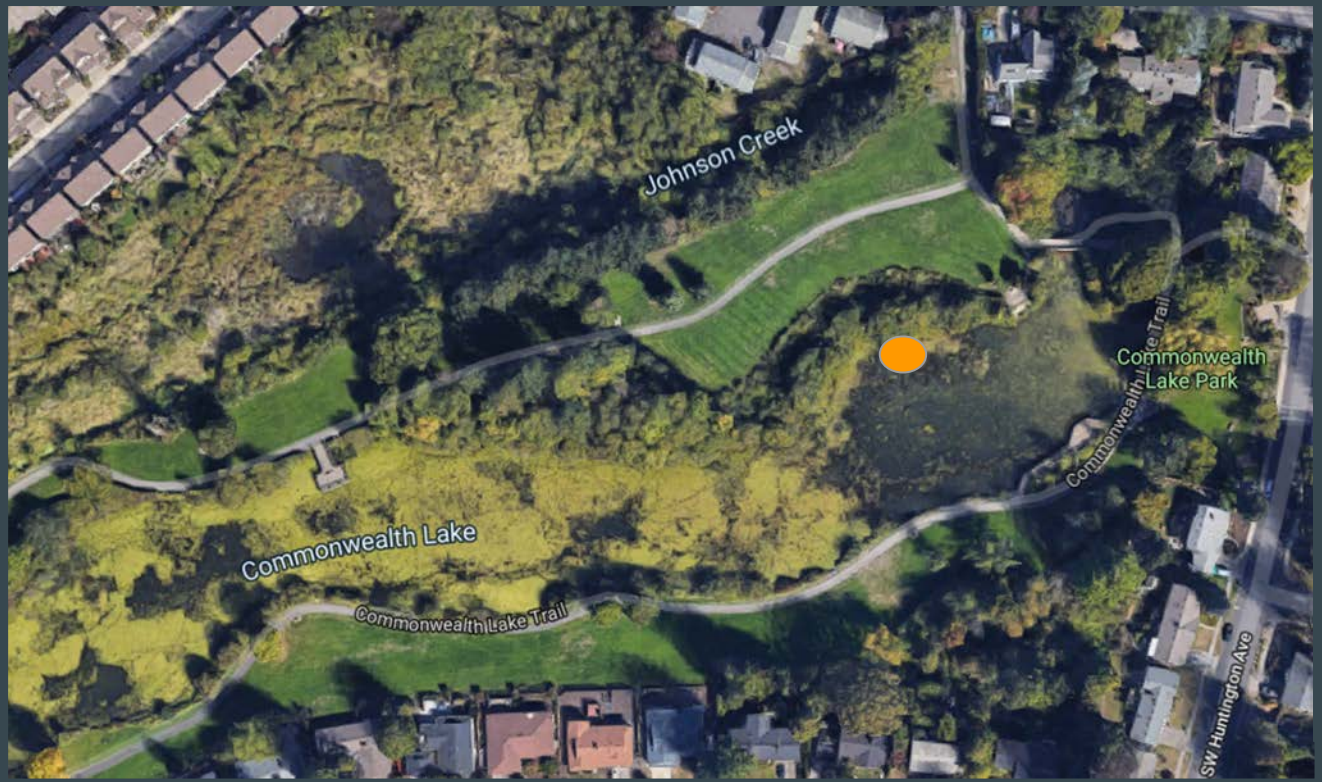
Commonwealth Lake Park



- ☑ Basking
- ☑ Aquatic Vegetation
- ❑ Connectivity

Buffer Distance



- ☑ Basking
- ☑ Aquatic Vegetation
- ☑ Connectivity
- ❑ Buffer

Buffer Distance

- ☑ Basking
- ☑ Aquatic Vegetation
- ☑ Connectivity
- ☐ Buffer

Buffer Distance

- [x] Basking
- [x] Aquatic Vegetation
- [x] Connectivity
- [x] Buffer

Turtle Nesting

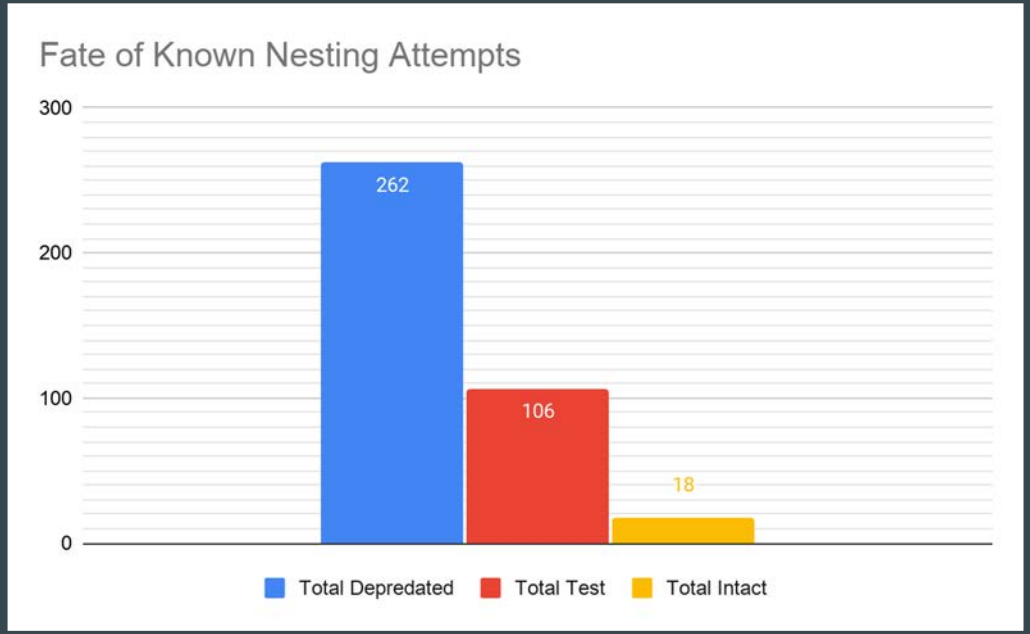
- High Solar Exposure
- Sparse Vegetation
- Above High Water

Nesting

Caged Nests

Results

- 25 Sites
- 185 Surveys
- 435 Hours
- 106 Test Digs
- 262 Depredated Nests
- 18 Intact Nests (17 caged)



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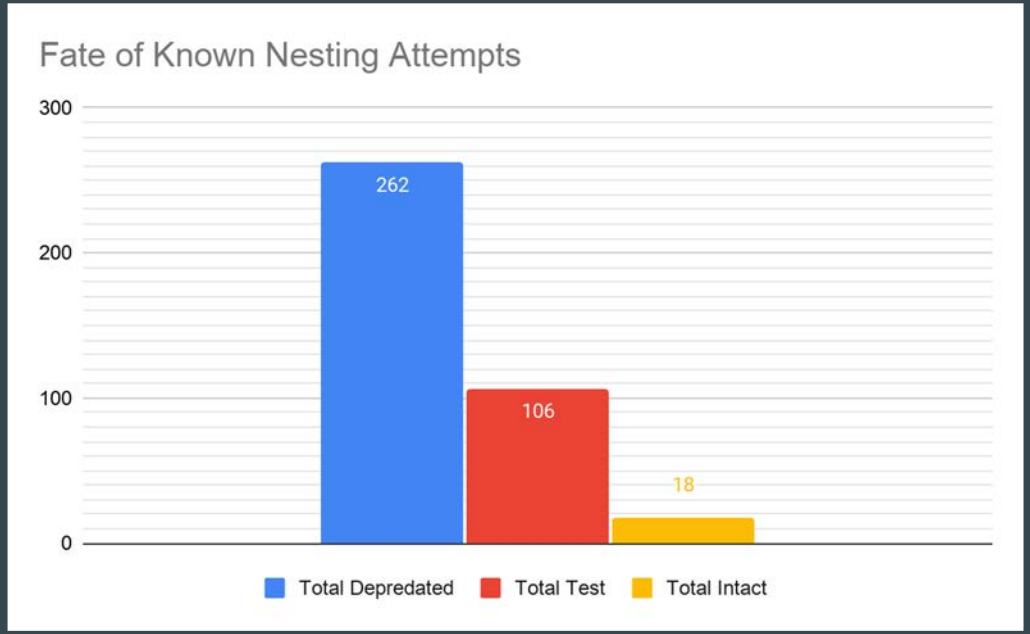
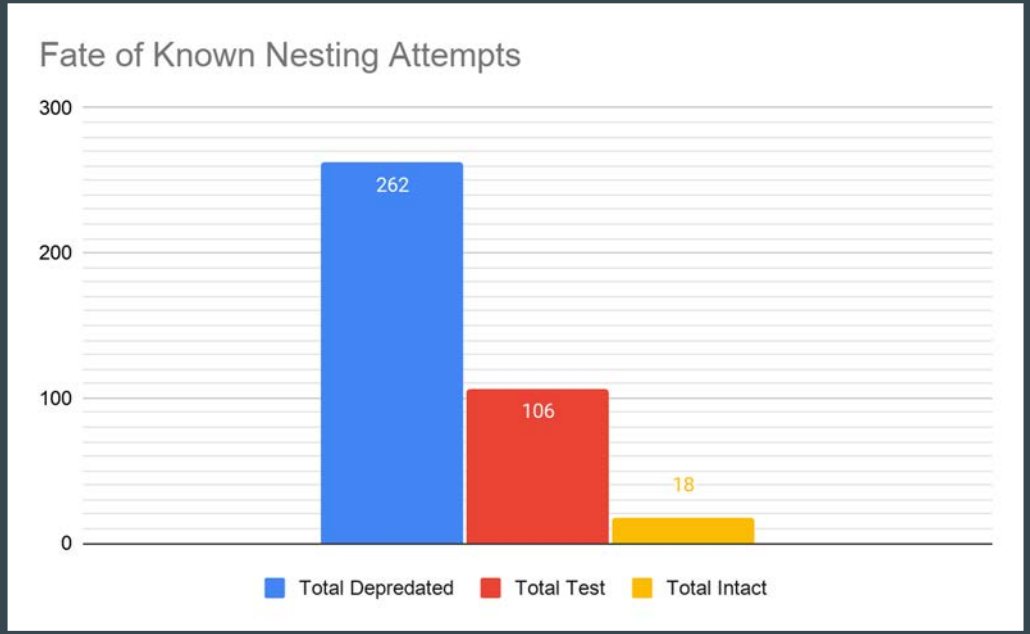


66% Test Digs at 3 sites

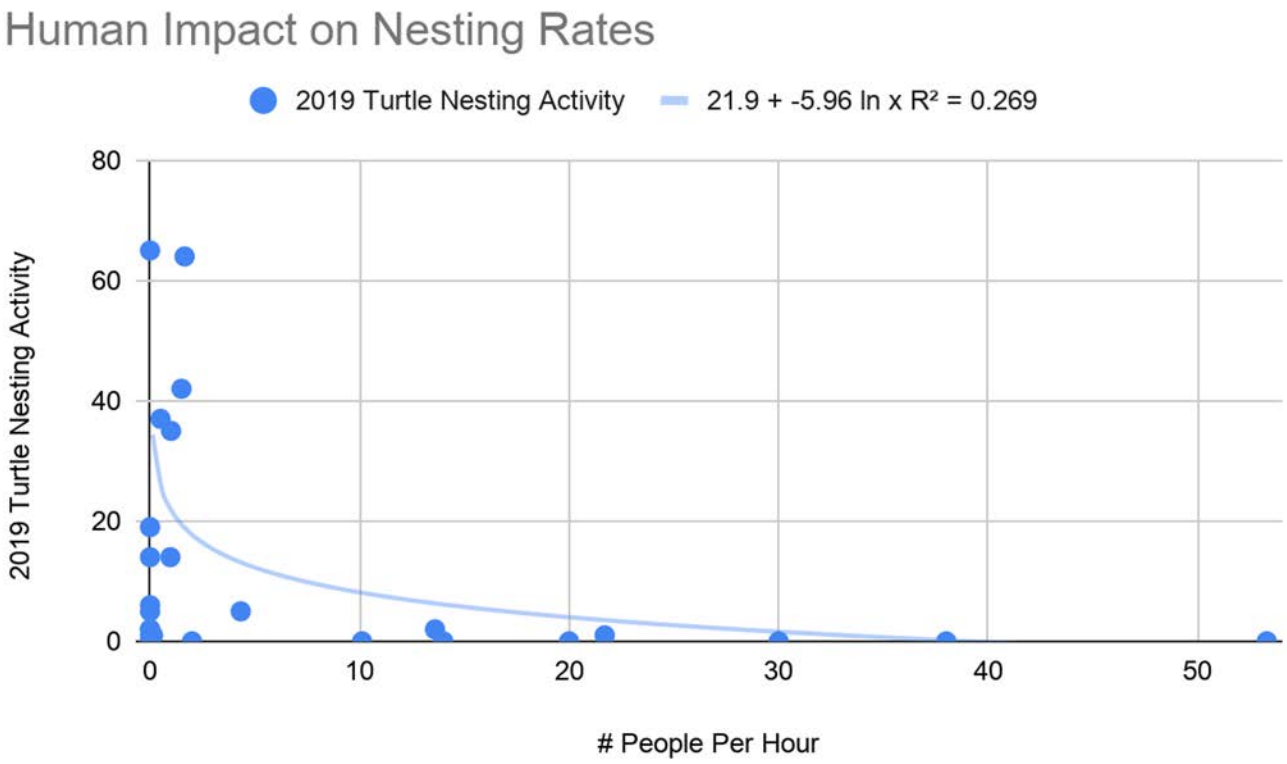
Carnage

- 25 Sites
- 185 Surveys
- 435 Hours
- 106 Test Digs
- 262 Depredated Nests
- 18 Intact Nests (17 caged)



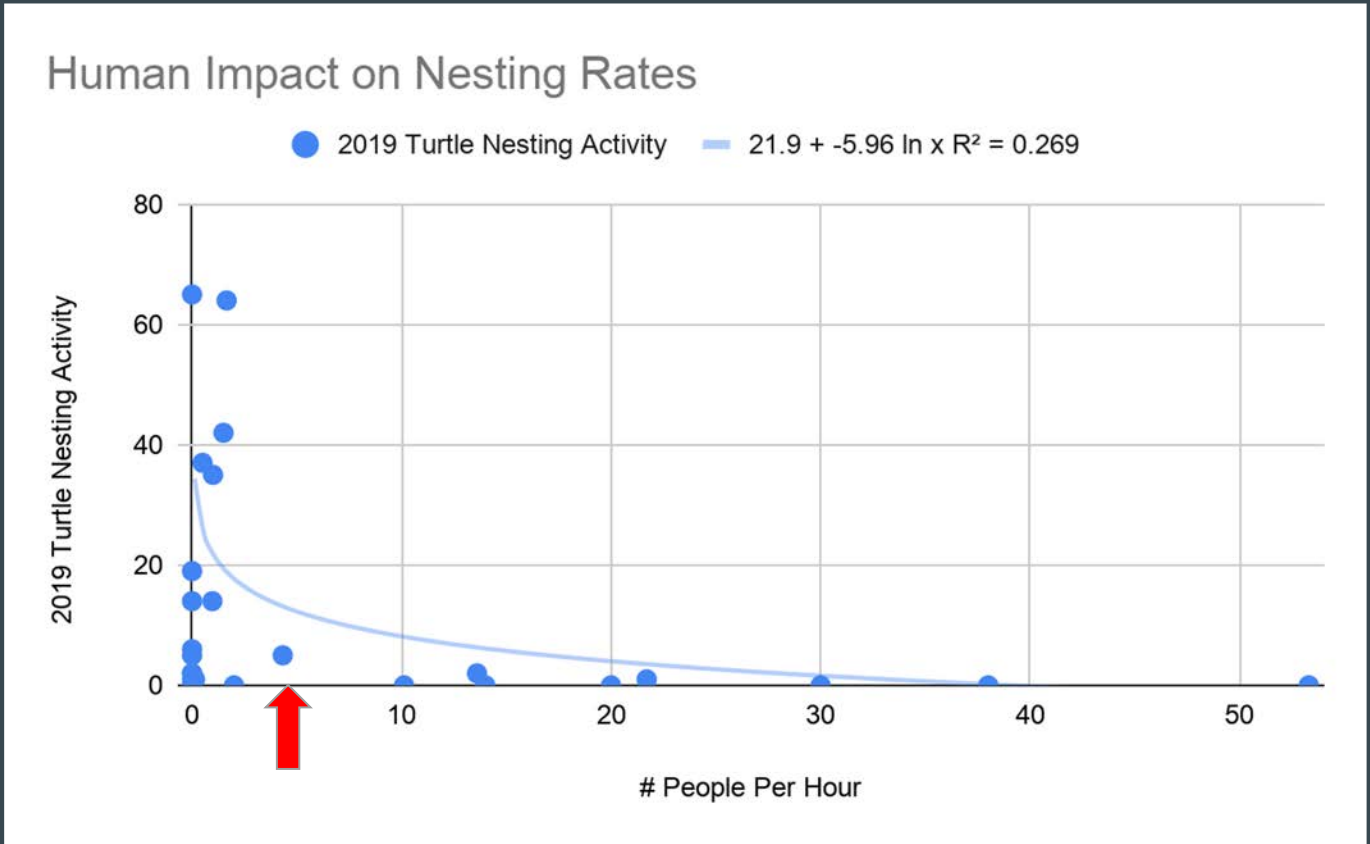
93% Depredation Rate!

Results

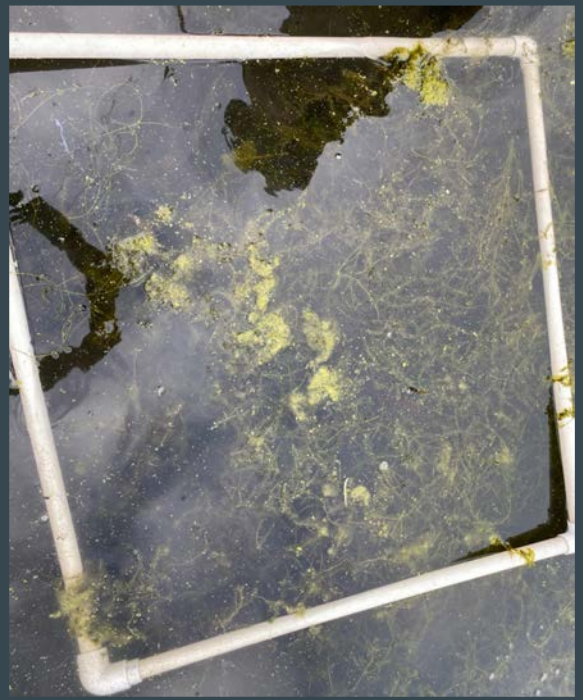

Human Impact on Nesting Rates
2019 Turtle Nesting Activity
21.9 + -5.96 ln x R² = 0.269
2019 Turtle Nesting Activity
80
60
40
20
0
0
10
20
30
40
50
People Per Hour

Results

>5 Pedestrians/Hour → 0 nesting



Juvenile Habitat



Ceratophyllum demersum

Elodea canadensis

Management Keys for Long-term Turtle Persistence

1. Buffer Distance at least 40 meters from basking areas to regular human (boat and foot) traffic.
2. Sunny Nesting Area with minimal human disturbance (seasonal trail closures, nesting)
3. Juvenile Habitat:
   - >60% Aquatic Vegetation
   - Small Woody Debris
   - 0-2m Depth Profile
4. Create off-channel habitat


Thank you!
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OREGON
Fish & Wildlife
TUALATIN HILLS
PARK & RECREATION DISTRICT
Metro
NORTHWEST ECOLOGICAL RESEARCH INSTITUTE
OREGON WILDLIFE FOUNDATION
PORTLAND PARKS & RECREATION
Healthy Parks, Healthy Portland

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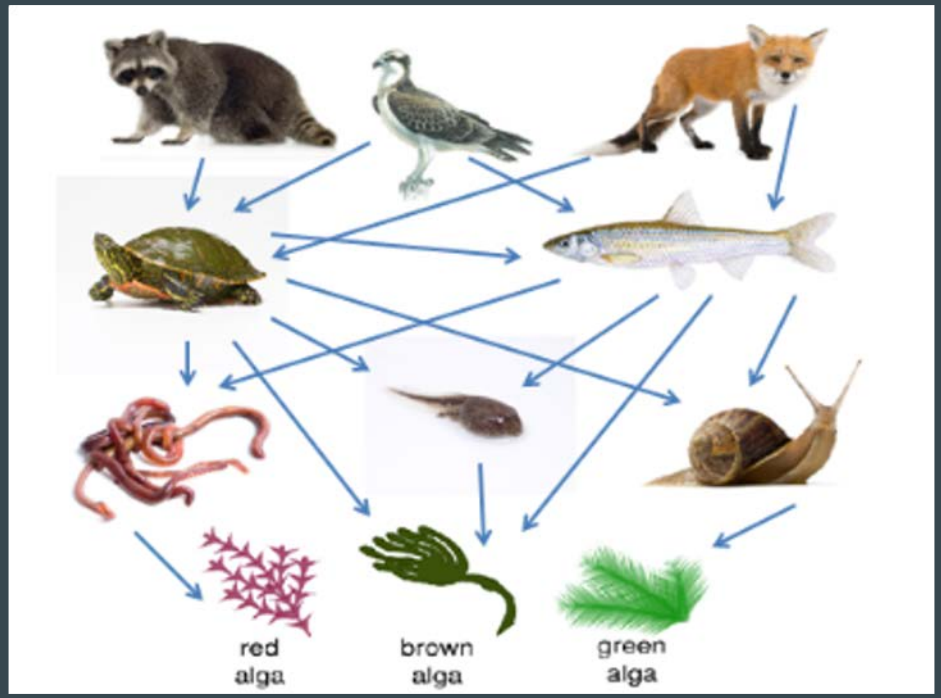
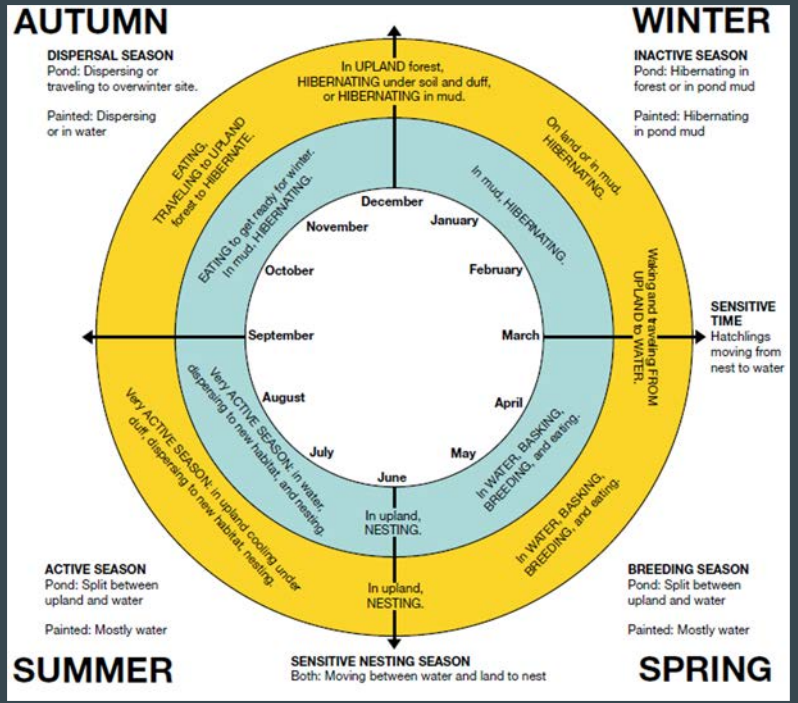
Question:

What are the factors limiting turtle populations?

Natural History





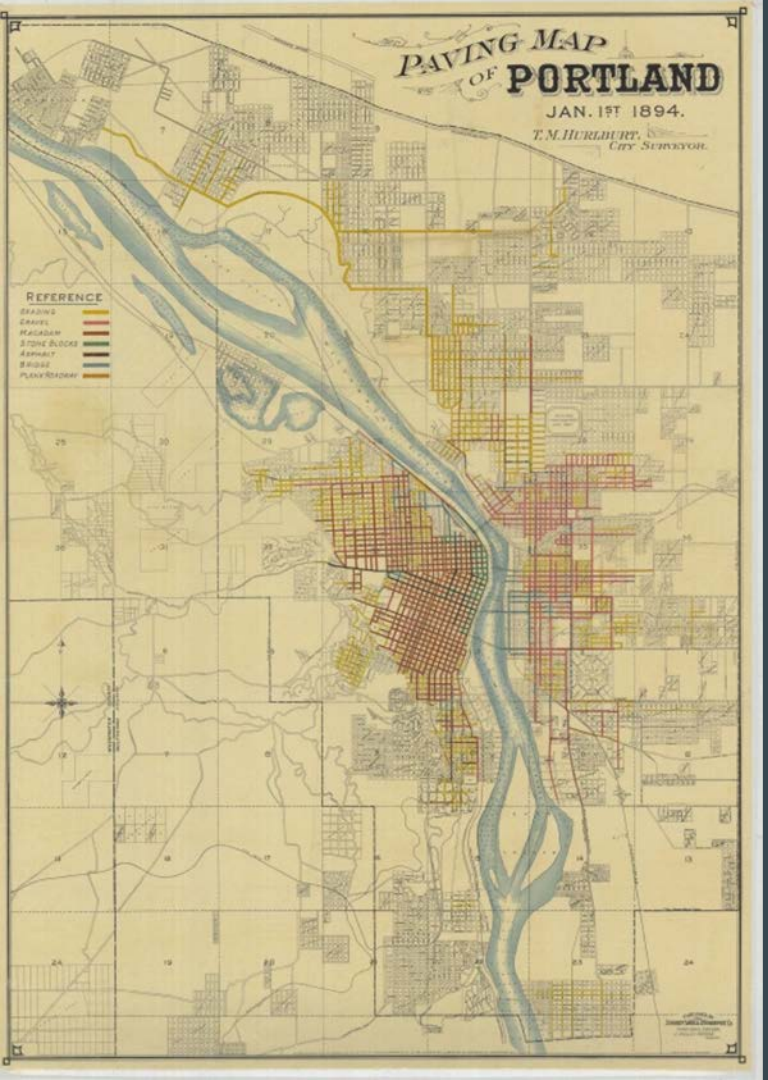
Gibbons and Nelson 1977. Delayed emergence dominant in many species. Aiken, SC

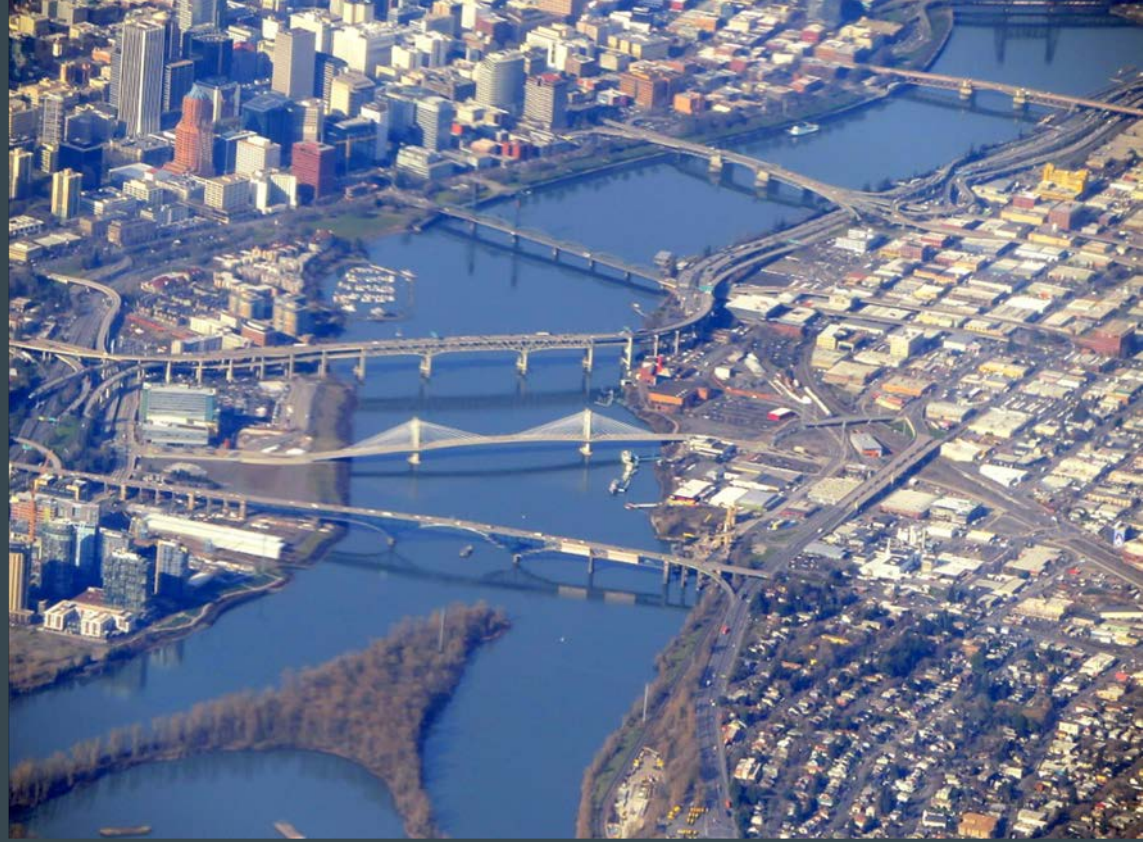
TABLE 2. *Seasonal emergence pattern of hatchling freshwater turtles in South Carolina. Letters represent months of the year. Numbers represent individual hatchlings.*

	F	M	A	M	J,J,A	S,O,N	Total	Percentage emerging in F,M,A
Deirochelys reticularia	–	113	45	1	4	1	164	96
Kinosternon subrubrum	10	74	10	0	1	1	96	98
Chrysemys scripta	–	47	24	5	3	3	82	87
Chrysemys floridana	–	22	9	–	1	–	32	97
Sternotherus odoratus	1	3	–	–	2	3	9	44
Total	11	259	88	6	11	8	383	93

ture as fall emergers (Ernst and Barbour, 1972), were each represented by a single

1976 (March $\bar{x}_{max} = 23.2$ C, $\bar{x}_{min} = 7.6$ C; April $\bar{x}_{max} = 26.3$ C, $\bar{x}_{min} = 8.4$ C). No re-

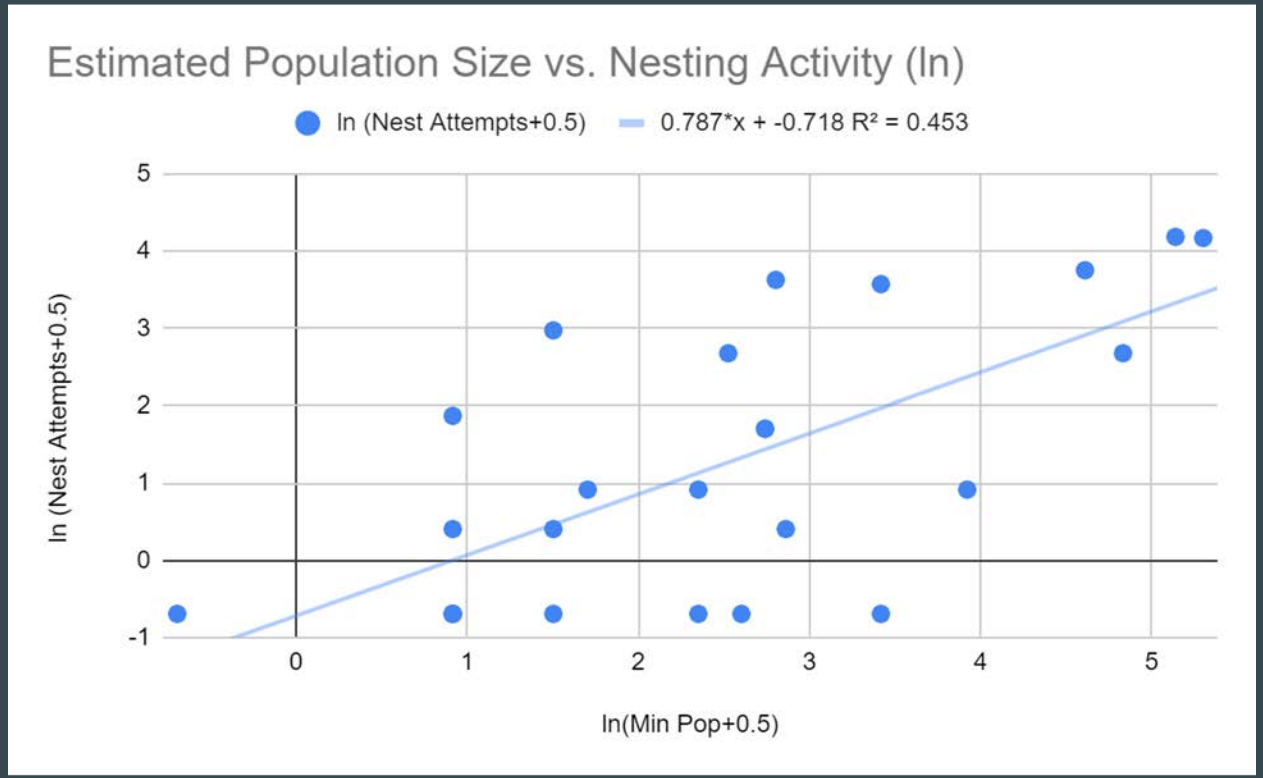




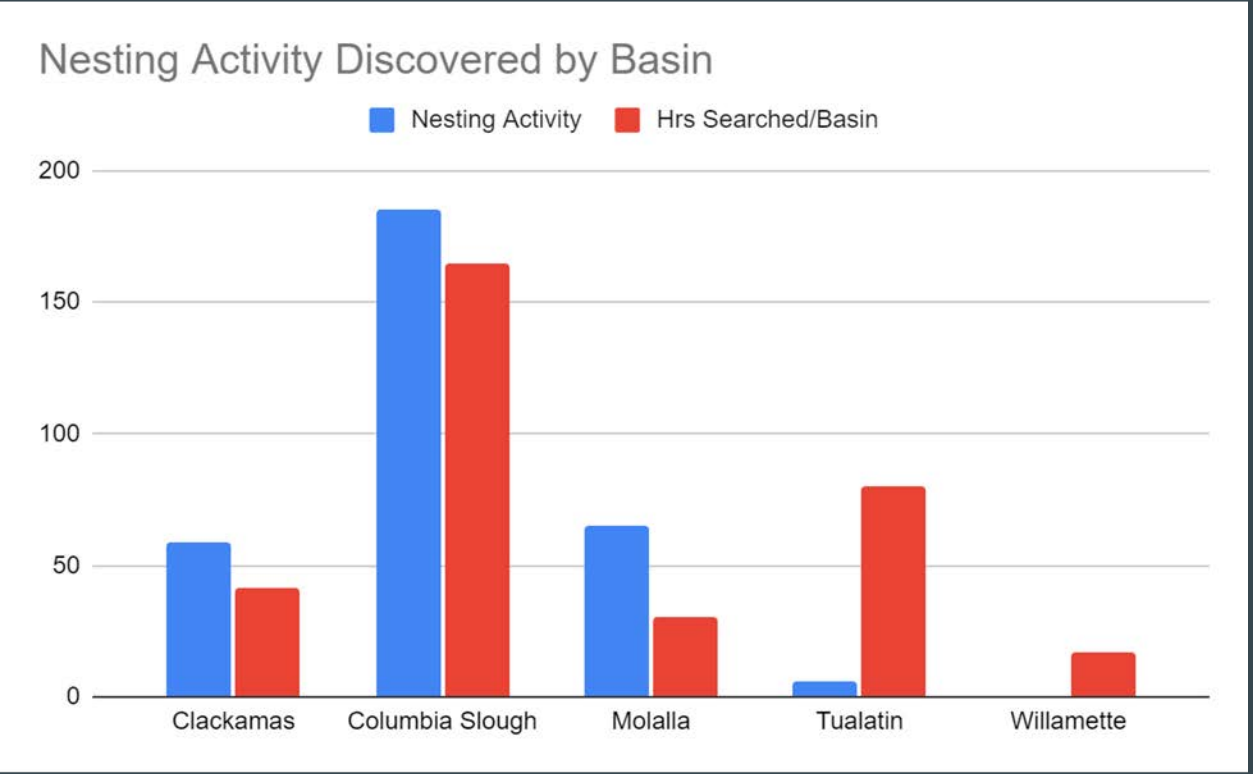
City of Portland Archives

Photo Credit: Pi

2019 Results



2019 Results



Age Class Survival

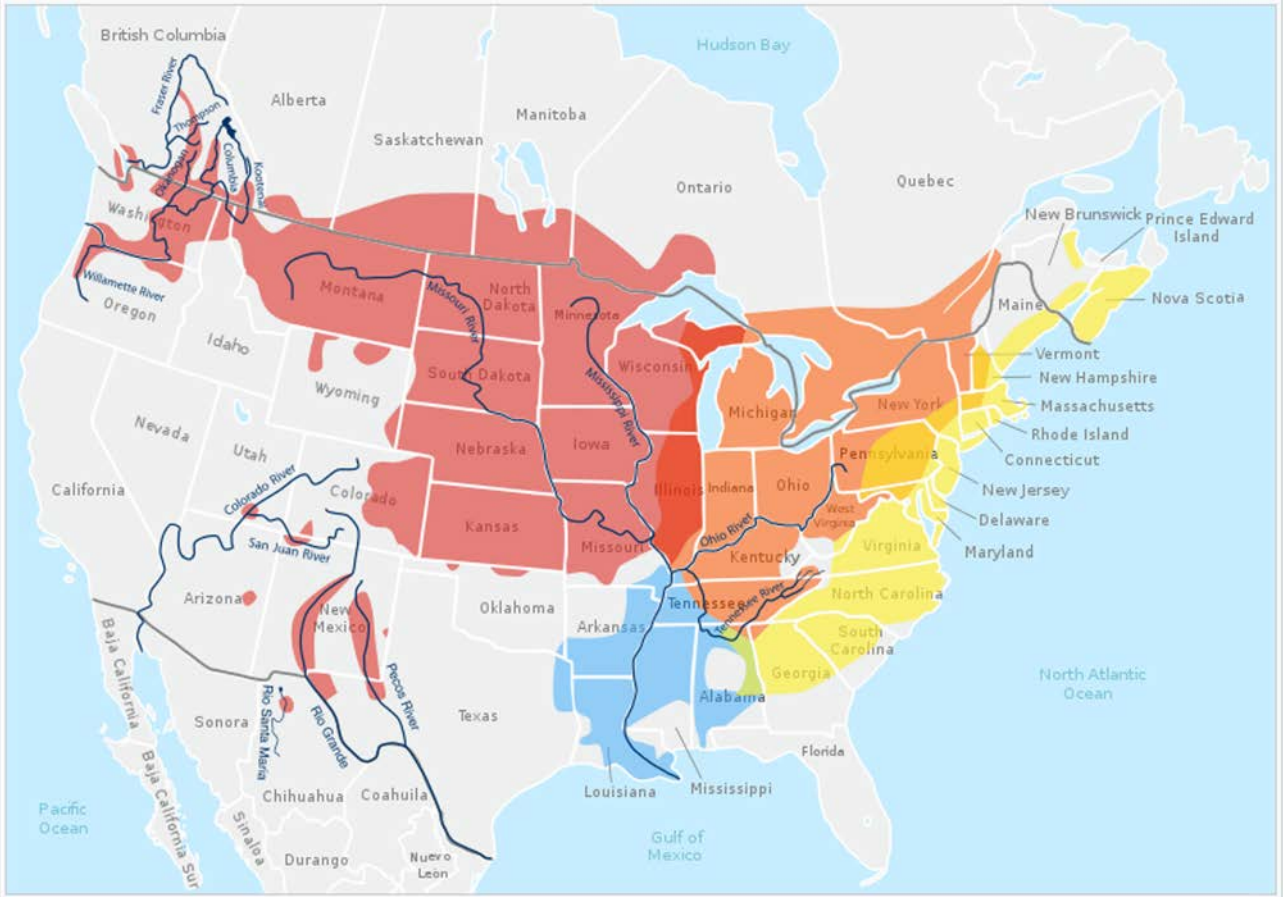
Table 2
Found in literature and used in model.

Age class	Tinkle et al. (1981)	Mitchell (1988)	Wilbur (1975a,b)	Model
Eggs and 1 year	0.67	0.19	0.08	0.33
2–3 years	0.76	0.46	0.82	0.6
4–7 years	0.76	0.94	0.82	0.7
8+ years	0.76	0.96	0.82	0.9

Table 3
For both males and females used in the matrix model.

Age class	Survivorship	Graduation
Egg and 1 year	0.33	0.33
2–3 years.	0.375	0.225
4–5 years.	0.4118	0.2882
6–7 years.	0.4118	0.2882
8+ years.	0.9	

Parrott et al 2010



Native range of the painted turtle (*C. picta*)
Dark grey for national borders
White for state and province borders
Dark blue for rivers, only showing those in article

- Eastern (*C. p. picta*)
- Midland (*C. p. marginata*)
- Southern (*C. p. dorsalis*)
- Western (*C. p. bellii*)

Intergrade mixtures (large areas only)

- Mix of eastern and midland
- Mix of eastern and southern
- Mix of midland and western

Nesting

Undiscovered nest
emerged 5/14/2020

Rumsfeldian
Unknown
Unknowns!

20 undeveloped eggs