



Economic Impact of Selected Invasive Species

Direct Costs Estimates and Economic Impacts for Washington State

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Economic Impacts of Invasive Species

- Environmental and Economic Costs of Nonindigenous Species in the United States, Pimentel et al. (2000, 2005)
- Oregon Noxious Weed Strategic Plan & Economic Analysis, ODA (2000)
- Economic Impact from Selected Noxious Weeds in Oregon, ODA (2014)

Funding Consortium/Contract

- Washington State Dept. of Agriculture
 - Washington State Noxious Weed Control Board
 - Washington Invasive Species Council
 - Other State Agencies
-
- Selected Contractor - Community Attributes Inc.

Invasive Species Selected

Invasive Plants (15)

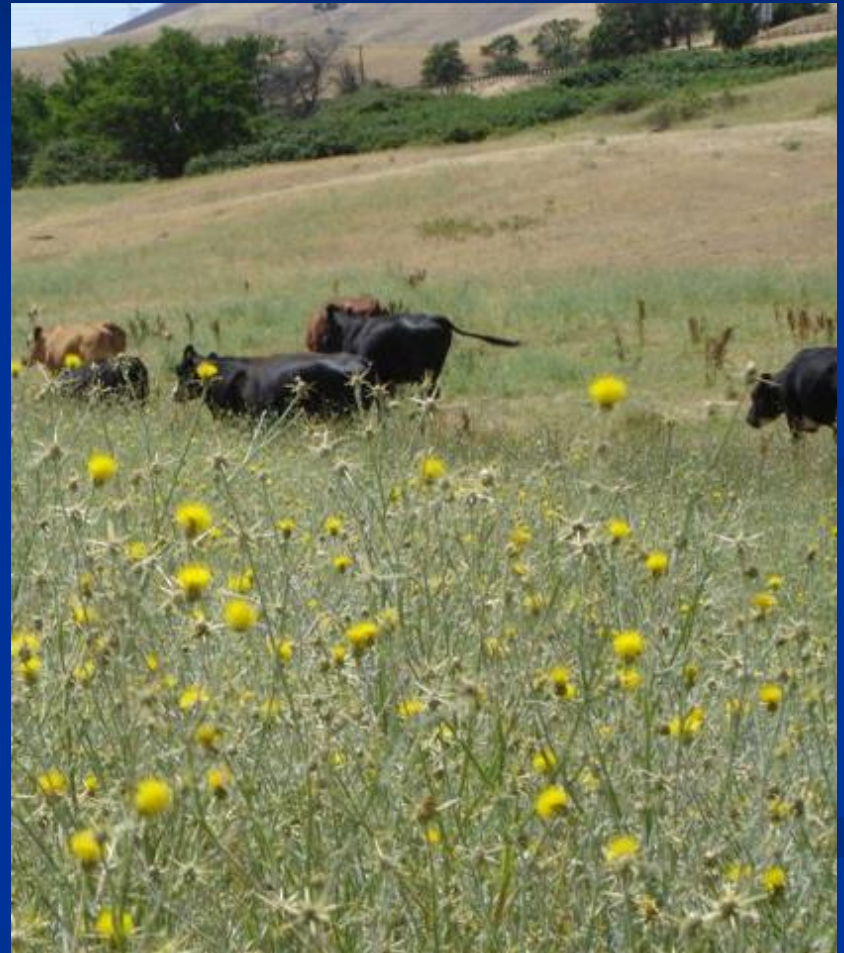
- Eurasian watermilfoil
- Himalayan blackberry
- Knapweeds (diffuse, meadow, spotted)
- Knotweeds (Bohemian, giant, Himalayan, Japanese)
- Leafy spurge
- Purple loosestrife
- Rush skeletonweed
- Scotch broom
- Smooth cordgrass
- Yellow starthistle

Invasive Animals (8)

- Apple maggot
- Asian and European gypsy moths
- Emerald ash borer
- Feral swine
- Nutria
- Quagga and zebra mussels

Summaries of Individual Species

- Description of Species
- Distribution in Washington (2016)
- Impacts Considered
- Other Considerations
- Direct Economic Impact of Species
- Total Economic Activity at Risk



Impacts Considered - Examples

- Toxicity to humans, livestock and wildlife
- Competition for water, nutrients
- Direct damage to crops and desirable species
- Increased erosion, flooding, impacts to water quality
- Decreased property values
- Loss of habitat, recreational opportunities
- Damage to infrastructure



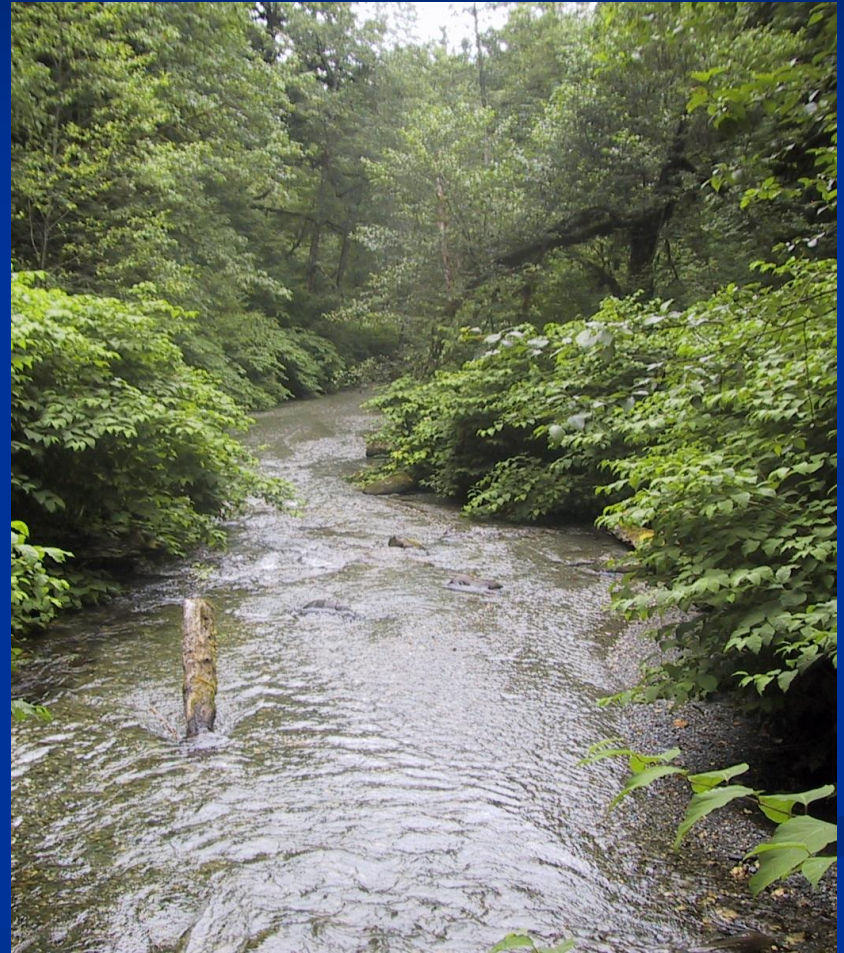
Other Considerations - Examples

- Cost of control
- Alternate hosts
- Potential health hazards
- Wildfire hazard
- Damage to machinery and equipment
- Quarantines



Direct Economic Impact of Species

- Rate of spread and amount and types of susceptible lands
- Resources affected - examples
 - Crops and livestock
 - Wildlands (incl. hunting, fishing, boating, habitat)
 - Timber
 - Shellfish
 - Water facilities (dams, irrigation systems)
 - Boating/boat launches



Total Economic Activity at Risk

Indirect and Induced Impacts – Economic Voodoo

- Washington State Input-Output model – 52 sectors of the state economy
- IMPLAN (Impact Analysis for Planning) social accounting matrices
- Output in dollars
- Jobs lost
- Lost labor income



Results

- Washington – \$1.3 billion per year without any prevention and control and the loss of up to 8,000 jobs
- Oregon between \$1.5 billion and \$2.4 billion personal income if infestation moved into all of the susceptible areas. 40.8 thousand jobs lost. The point estimate for mean within this range would represent 40.8 thousand jobs lost

Most Costly Invasive Species

Invasive Plants

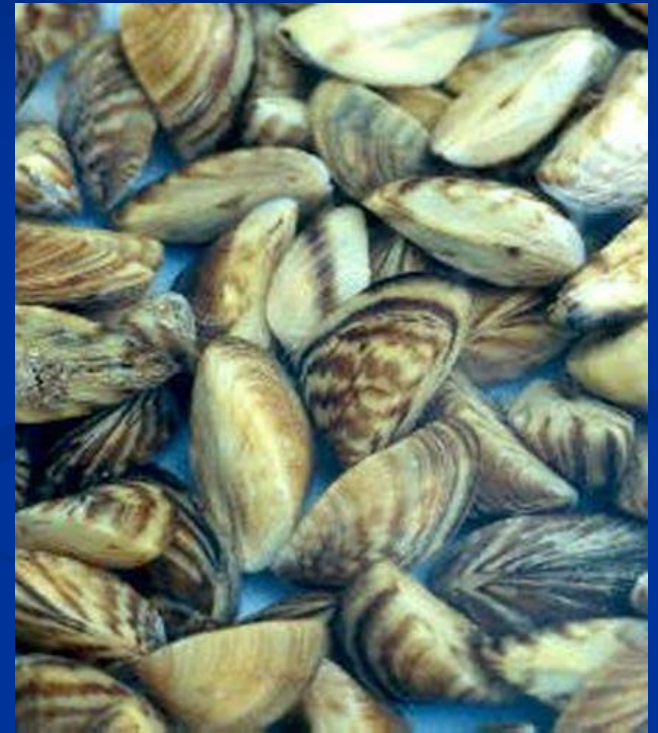
- Rush Skeletonweed
 - \$149.2 million dollars
 - 1,080 jobs
- Scotch Broom
 - \$142.7 million dollars
 - 660 jobs

Invasive Animals

- Apple Maggot
 - \$392.5 million dollars
 - 2,900 jobs
- Quagga/Zebra Mussels
 - \$100.1 million dollars
 - 500 jobs

Impacts by Industry

- Crops - \$589.2 million
 - 4,400 jobs
- Timber - \$297.0 million
 - 1,300 jobs
- Livestock - \$282.9 million
 - 1,500 jobs
- Water facilities - \$100.5 million
 - 500 jobs
- Recreation - \$47.6 million
 - 300 jobs



Knotweed Impacts by County

| County | Acres Impacted | | | Livestock | Direct Revenue Impacts | | Total | Lost Revenues | Total Economic Impacts | |
|--------------|----------------|---------|---------|-----------|------------------------|----------------------|---------|---------------|------------------------|-------------------|
| | Rangeland | Hunting | Fishing | | Recreational Hunting | Recreational Fishing | | | Lost Jobs | Lost Labor Income |
| Adams | - | - | - | - | - | - | - | \$5,131 | - | \$0 |
| Asotin | - | - | 12,670 | - | - | 2,650 | 2,650 | \$6,029 | - | \$1,762 |
| Benton | - | - | 7,820 | - | - | 1,640 | 1,640 | \$31,641 | - | \$1,106 |
| Chelan | - | - | 64,190 | - | - | 13,440 | 13,440 | \$39,109 | - | \$8,641 |
| Clallam | 1,570 | 1,570 | 59,460 | 103,640 | 2,720 | 12,450 | 118,810 | \$213,494 | 1 | \$76,233 |
| Clark | 560 | 560 | 21,890 | 36,820 | 970 | 4,590 | 42,380 | \$124,487 | 1 | \$29,347 |
| Columbia | - | - | 17,180 | - | - | 3,600 | 3,600 | \$6,616 | - | \$2,399 |
| Cowlitz | 1,780 | 1,780 | 35,850 | 117,740 | 3,090 | 7,510 | 128,340 | \$259,107 | 3 | \$86,637 |
| Douglas | - | - | 10,460 | - | - | 2,190 | 2,190 | \$8,640 | - | \$1,439 |
| Ferry | - | - | 24,840 | - | - | 5,200 | 5,200 | \$8,616 | - | \$3,370 |
| Franklin | - | - | 5,930 | - | - | 1,240 | 1,240 | \$20,390 | - | \$838 |
| Garfield | - | - | 12,750 | - | - | 2,670 | 2,670 | \$4,214 | - | \$1,636 |
| Grant | - | - | 15,870 | - | - | 3,320 | 3,320 | \$30,721 | - | \$2,152 |
| Grays Harbor | 2,600 | 2,600 | 78,110 | 172,000 | 4,520 | 16,360 | 192,880 | \$369,976 | 3 | \$129,901 |
| Island | 40 | 40 | 90 | 2,320 | 60 | 20 | 2,400 | \$8,196 | - | \$1,515 |
| Jefferson | 1,230 | 1,230 | 43,380 | 81,590 | 2,140 | 9,080 | 92,810 | \$172,145 | 1 | \$61,065 |
| King | 1,460 | 1,460 | 57,420 | 96,590 | 2,540 | 12,020 | 111,150 | \$556,255 | 1 | \$75,610 |
| Kitsap | 140 | 140 | 7,010 | 9,230 | 240 | 1,470 | 10,940 | \$35,904 | - | \$6,732 |
| Kittitas | - | - | 53,410 | - | - | 11,190 | 11,190 | \$23,150 | - | \$7,359 |
| Klickitat | - | - | 32,900 | - | - | 6,890 | 6,890 | \$14,118 | - | \$4,431 |
| Lewis | 2,610 | 2,610 | 75,310 | 172,660 | 4,530 | 15,770 | 192,960 | \$378,340 | 3 | \$131,257 |
| Lincoln | - | - | 14,530 | - | - | 3,040 | 3,040 | \$6,034 | - | \$2,031 |
| Mason | 1,250 | 1,250 | 29,960 | 82,500 | 2,170 | 6,270 | 90,940 | \$165,962 | 1 | \$57,774 |
| Okanogan | - | - | 80,770 | - | - | 16,920 | 16,920 | \$34,363 | - | \$10,496 |
| Pacific | 1,370 | 1,370 | 36,690 | 90,570 | 2,380 | 7,680 | 100,630 | \$185,644 | 1 | \$65,434 |
| Pend Oreille | - | - | 41,650 | - | - | 8,720 | 8,720 | \$13,814 | - | \$5,383 |
| Pierce | 1,530 | 1,530 | 34,740 | 101,150 | 2,660 | 7,270 | 111,080 | \$325,120 | 1 | \$75,311 |
| San Juan | 40 | 40 | 450 | 2,370 | 60 | 90 | 2,520 | \$6,523 | - | \$1,646 |
| Skagit | 1,460 | 1,460 | 42,000 | 96,440 | 2,530 | 8,790 | 107,760 | \$258,118 | 1 | \$77,368 |
| Skamania | 1,760 | 1,760 | 40,510 | 116,170 | 3,050 | 8,480 | 127,700 | \$230,133 | 3 | \$83,244 |
| Snohomish | 1,350 | 1,350 | 58,580 | 89,120 | 2,340 | 12,270 | 103,730 | \$256,280 | 1 | \$68,019 |
| Spokane | - | - | 17,100 | - | - | 3,580 | 3,580 | \$69,423 | - | \$2,559 |
| Stevens | - | - | 36,160 | - | - | 7,570 | 7,570 | \$14,800 | - | \$4,959 |
| Thurston | 620 | 620 | 21,210 | 41,260 | 1,080 | 4,440 | 46,780 | \$112,767 | 1 | \$31,040 |
| Wahkiakum | 330 | 330 | 13,880 | 22,020 | 580 | 2,910 | 25,510 | \$45,271 | - | \$16,247 |
| Walla Walla | - | - | 17,890 | - | - | 3,750 | 3,750 | \$17,033 | - | \$2,422 |
| Whatcom | 1,980 | 1,980 | 49,900 | 131,140 | 3,440 | 10,450 | 145,030 | \$375,627 | 3 | \$105,789 |
| Whitman | - | - | 14,500 | - | - | 3,040 | 3,040 | \$13,590 | - | \$1,899 |
| Yakima | - | - | 79,550 | - | - | 16,660 | 16,660 | \$85,221 | - | \$10,949 |

Economic Impact of Invasive Knotweed

\$4.5 Million Total Economic Impact to Washington State

Invasive knotweed grows in many different habitats in Washington State, but can primarily be found along waterways. The tall, bamboo-like plants are robust perennials that form dense thickets and spread by long creeping rhizomes.

Invasive knotweed includes giant knotweed (*Polygonum sachalinense*), Himalayan knotweed (*Polygonum polystachyum*), the hybrid bohemian knotweed (*Polygonum bohemicum*), and Japanese knotweed (*Polygonum cuspidatum*). The plants can be difficult to tell apart, and share similar habitat, impacts and control methods.

If invasive knotweed is not controlled or prevented and increases at a mere 1 percent a year, \$4.5 million in business sales could be lost across the state, along with 25 jobs and \$1.2 million in lost income.

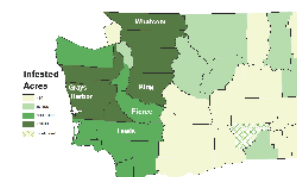
Top 5 At-Risk Counties

Invasive knotweed disproportionately affects different areas in the state. The counties listed here could incur the following total economic impact* from invasive knotweed spread.

| | Economic Impact |
|---------------------|-----------------|
| King County | \$556,000 |
| Lewis County | \$378,000 |
| Whatcom County | \$378,000 |
| Grays Harbor County | \$370,000 |
| Pierce County | \$325,000 |
| All Other Counties | \$2.5 million |

*The total economic impact includes direct and secondary impacts.

Invasive Knotweed Distribution, 2016



Management & Restoration Investment

Many different agencies, Native American tribes, and non-governmental organizations have worked cooperatively to stop invasive knotweed and improve habitat damaged by the plant. The spread of invasive knotweed threatens this investment.

From 2004 to 2016, the Washington State Recreation and Conservation Office and the Washington State Department of Agriculture have invested \$30.4 million (2017 dollars) to control invasive knotweed and restore shoreline areas for salmon recovery. If invasive knotweed is allowed to spread and impact these areas, these significant investments in mitigation and habitat restoration may be lost.

Direct Impacts by Industry

Invasive knotweed can out-compete native plants and crops, lowering the amount of crops farmers can harvest and reducing the diversity of plants in the state. Knotweed can dominate riverbanks, replacing the trees that normally would grow there. Without tree roots to hold the soil on the bank, more erosion occurs and water quality is degraded, harming wildlife, including salmon. The direct economic impact to several of Washington's industries include:

| | | |
|--|---|--|
| | | |
| Rangeland \$1.57 million in direct costs | Fishing \$265,000 in direct costs | Hunting \$41,000 in direct costs |

Next Steps

- Additional County Level Impacts
- Northern Pike
- Flowering Rush
- Common Reed (*Phragmites australis*)

Questions?

Google:

Washington Invasive Species Council
Council Projects

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