

**Severn River Case Study: An extensive study determined yellow perch did not recover after a twenty year fishery closure.**

**Results:**



- Poor oxygen conditions in summer, potentially lethal salinity and contaminants impact habitat
- Very low egg hatching rate

- Very low survival of larvae
- Migrants from other watersheds provide fishery
- Adults do not successfully reproduce

**Mattawoman Creek Case Study: Long term data (1989-present) examined to evaluate impacts of increased development in the watershed.**

**Results:**



- Fish diversity and abundance in channel habitat collapsed suddenly at suburban development threshold
- Stream habitat is deteriorating; spawning has declined

- Yellow perch larval feed success may be declining
- Nutrient loads high from erosion, while aquatic vegetation (SAV), chlorophyll and clarity are meeting established Chesapeake Habitat Goals
- Bottom oxygen conditions are declining, but not below target concentrations of 5.0 mg/L
- Oxygen conditions in SAV beds frequently below target concentrations for fish (5.0 mg/L)

**Summary:**

- Impervious surface thresholds have been identified and can be applied to fish and land management
- A development threshold for severe negative changes (10% impervious surface, which approximates a suburb) exists for fisheries
- Declines in stream spawning of anadromous fish are associated with suburban development
- Declines in yellow perch survival and feeding success are associated with impervious cover increases beyond the suburban level
- Declines in important recreational and commercial fish and blue crabs are associated with suburban development
- Fisheries management options become limited as development changes a watershed from rural to suburban
- Land management if fish management

**For more information find us at:**

<http://www.dnr.state.md.us/fisheries/fhlep/>

**Or Contact:**

**Jim Uphoff**

Office: 410-226-0078 x174

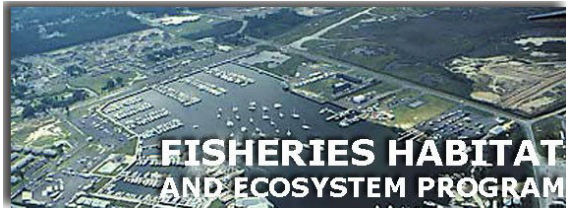
Email: [juphoff@dnr.state.md.us](mailto:juphoff@dnr.state.md.us)



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# Fisheries Service: Fisheries Habitat and Ecosystems Program





**Goal:**

**Develop ecosystem-based fisheries management strategies that will sustain fish communities for the future.**

- Working to understand the relationship between land use, water quality, and health of fisheries in the Chesapeake region
- Identifying linkages between development and fish habitat quality
- Promoting sound planning for sustainable fisheries

**Current Studies:**

- Larval Yellow Perch Presence and Absence
- Larval Yellow Perch RNA:DNA
- Larval Yellow Perch Feeding Analysis
- Spring Stream Spawning
- Summer Estuarine Fish Community Changes

**Detailed information on the following can be found on our Publications & Reports page:**

<http://www.dnr.maryland.gov/fisheries/fhep/index.asp?p=pub>

**Results:**



**Spring Stream Ichthyoplankton Study:** Studies are conducted in several watersheds to understand the impact of urbanization on spawning habitat. Ichthyoplankton (fish eggs and larvae) are sampled and their presence/absence is compared to historical data and land use changes.

**Results:**

- Systems with greater than 10% impervious cover are degraded
- Spawning habitat occupation declines with increasing development

**Spring Larval Yellow Perch Presence-Absence Study:** Yellow perch larval sampling is conducted in tidal rivers in the spring. Data collected during this study are compared to historical data to determine the survival rates of larval yellow perch in the rivers sampled.

**Results:**

- Increased development is associated with declines in larval yellow perch presence
- Impervious surface of 10% in a watershed represents a threshold
- Larvae are most consistently present in rural, forested watersheds, agricultural watersheds are intermediate, and suburban-urban watersheds are poorest.



**Spring Larval Yellow Perch Feeding Analysis Study:** Yellow perch larvae are analyzed for feeding success and diet composition from rural to developed watersheds.



**Results:**

- Feeding success decreases as impervious surface increases
- Annual variability in feeding success is much greater at high levels of impervious surface
- Poor feeding success can cause starvation and failure of a year-class



**Summer Estuarine Fish Community Sampling Study:** Several tidal watersheds are sampled to determine relationships among development, bottom dissolved oxygen, and the presence of key indicator species.

**Results:**

- Indicator species (white perch, striped bass, spot and blue crab) and dissolved oxygen in bottom habitat decline with increased impervious surface
- Changes in systems with low or no salinity are still under study. Some appear to have declined suddenly at suburban levels of development, while others are providing habitat. Detrimental declines in bottom oxygen are not apparent.
- A threshold for negative responses is evident at 10% impervious surface (suburban development)