Compact Development, Impervious Surfaces, and Stream Health

Thurston Regional Planning Council Technical Brief
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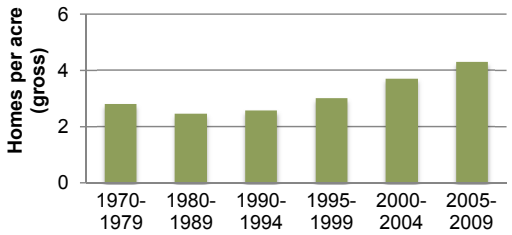
One of the things we can do to protect our streams is to support compact growth.

Land use plans developed under the Growth Management Act (GMA) show where and how future growth can be accommodated. For each area of the County zoning districts contained in land use plans indicate the density ranges at which growth can occur. Density is simply the number of residential units divided by acres. If you build 20 homes, and they take up 5 acres of land (including the roads and community areas), the density is 4 units per acre.

Since growth management plans (local Comprehensive Plans and associated regulations) went into effect in the mid-1990s, urban densities for single family homes have increased from around 2.5 dwellings per acre to around 4.3.

In the next 30 years, Thurston County is expected to grow by approximately 170,000 people. Accommodating these people will require will require roughly 80,000 housing units. Around 68% of growth in Thurston County goes into the urban areas (around 55,000 homes), and the remainder onto rural lands.

Changes in Subdivision Density In Urban Thurston County



Source: TRPC data program.

To accommodate these new homes it will take around 12,500 acres if densities remain at around 4.3 units per acre. At pre-1995 densities – it would have taken over 22,000 acres to accommodate the same number of homes – a difference in land area larger than the current city limits of Bucoda, Rainier, Tenino, and Yelm combined.

What does this Mean for Stream Health?

Among other variables, studies have shown a strong relationship between impervious area and forest cover in a basin or watershed and the health of streams and other water resources. Impervious area is directly related to zoning density. As lot sizes decrease, the percentage of the lot covered in impervious area increases.

The greater the amount of impervious area and corresponding loss in forest cover, the less water that is absorbed into the ground – being filtered naturally and slowly returning to our ground water and stream systems. Increased surface runoff leads to more pollution in our streams and inlets, to higher and increased numbers of flood events, and to degradation of our streams and stream beds.

What are Impervious Surfaces?

Parking lots, roof tops, roads, and even compacted lawns are impervious surfaces.

Research shows that as development increases (measured as changes in impervious area), impacts to streams tend to progress. As a guide, natural resource managers use generalized breakpoints at approximately 10 and 25-30 percent impervious to reflect potentially important transitions in stream health, based on an array of stream-health indicators.

Protecting Intact/Sensitive Streams

Many lowland stream basins in *rural* Thurston County are relatively intact, although sensitive to growth pressures. Typically these stream basins have less than 10 percent total impervious area basin-wide.

One key to protecting healthy or intact streams is to limit the density of future growth in order to keep total impervious area under two to five percent. This requires rural zoning – or residential lots that are five acres or larger. In general, impervious area coverage of a five acre residential lot is around three percent.

Minimizing Further Damage in Impacted Streams

Most of Thurston County's *urban* basins have between 10-25 percent impervious area and are already impacted by growth. These are the basins where much of the forecast growth is being directed – which will add more impervious area. There are two keys to minimizing further impacts to these streams:

1. Reduce the amount of *new* impervious area by supporting compact development and redevelopment of underutilized parcels in the urban downtowns.

2. Install stormwater runoff infrastructure (ponds and treatment facilities) for all new development.

Reducing New Impervious Area

Let's take the 55,000 dwelling units forecast for urban Thurston County over the next 30 years:

- If built at pre-GMA density of 2.5 dwellings per acre, they will produce around 7,000 acres of impervious surfaces.

- If built at post-GMA density of 4.3 units per acre, they will produce around 4,500 acres of impervious surfaces – a difference of 35%.

Improve Upon Existing Conditions in Degraded Stream Basins

- Many of our urban centers were built before stormwater management tools were a requirement. In these areas, streams are often degraded. Redevelopment provides an opportunity to retrofit "built up" areas with stormwater infrastructure.

Intact/Sensitive Stream
basins have a high forest cover (>65%), low (<10%) impervious area cover, and well functioning stream system. Even at low levels of impervious surfaces (2-5 percent) some signs of impacts to water quality or in-stream habitat can appear.

Impacted Stream
basins have a decreased forest cover (<65%) and 10-25 percent impervious area cover. Typically these streams show impacts to in-stream and habitat conditions, and have one or more water quality violations.

Degraded Stream
basins have very little natural forest cover remaining and above 25 percent impervious area cover. Typically these streams show signs of degradation to in-stream and habitat conditions, and have numerous water quality violations.

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