



## WASHINGTON

### BIOSOLIDS MANAGEMENT 2018 - STATE SUMMARY

This summary, a dashboard of state statistics, & further data are at [www.biosolidsdata.org](http://www.biosolidsdata.org)

#### ***In Washington...***

- *Biosolids land application has been routine for most water resource recovery facilities (WRRFs) since the late 1980s. Recycling biosolids is encouraged by state law. The large majority of biosolids are generated in the wetter, western part of the state and are land applied in the drier central and eastern regions where large agricultural tracts of land have been permitted for 40+ years and unique centralized biosolids brokers serve as distribution hubs. Relatively long biosolids transport distances are common.*
- *In 2018, agricultural land application of bulk, Class B biosolids accounted for about 49% of the state's biosolids, including a large percentage of the biosolids from King County (Seattle). An estimated 5% of the state's Class B biosolids was used on forest lands.*
- *Exceptional quality (EQ) biosolids are produced by several communities, including Tacoma with its famous Tagro products. About 23% of Washington's biosolids are EQ products distributed for turf, landscaping, horticulture, and gardening.*
- *In 2018, there were five WRRFs with sewage sludge incinerators (SSIs); two are converting to other biosolids management systems in the 2020s.*
- *Washington has the most robust, long-term support for biosolids recycling of any jurisdiction in North America, involving public and private collaboration, universities, and the oldest and best regional biosolids association in the country: Northwest Biosolids.*

#### **Biosolids Management in Washington**

Seiple et al. (2020) identify 330 WRRFs in Washington (WA), with just 23 of these processing 74% of the state's total wastewater flow (data from 2012). The Washington Department of Ecology (Ecology) estimates that the state produced 105,900 dry U.S. tons of biosolids in 2018. King County, which includes Seattle, is the largest wastewater agency in the state, producing 30,925 dry U.S. tons of biosolids in 2018 – nearly 30% of the state total. King County and most other Washington WRRFs – most of which are in the wetter, western part of the state – land apply their biosolids, usually on farms in the drier central and eastern parts of the state. Anaerobic digestion is common for the larger facilities, producing Class B products. In addition, about one quarter of the state's biosolids are treated to Class A standards and are marketed and distributed as exceptional quality (EQ) products – mostly compost. The famous Tacoma product – Tagro – is made by multi-stage anaerobic digestion achieving Class A quality followed by blending with sawdust, sand, and/or bark to create user-friendly EQ soil amendments widely used in area gardens and landscaping.

Like their larger facility counterparts, many smaller facilities in Washington also have active beneficial use programs. The Department of Ecology also oversees permits for biosolids management at some facilities that are not WRRFs, including septage management facilities, beneficial use facilities, and compost operations. There are eight biosolids composters, and one lime stabilization facility, that are separate preparers accepting solids from an estimated 30 WRRFs.

In all, nearly 80% of Washington's wastewater solids are applied to land. The remaining amount is incinerated (15%) and landfilled (3%). In addition, each year, wastewater solids at many small rural WRRFs are pumped into lagoons for long-term storage; these are not included in the data presented here. Only when the solids are removed (dredged out), every 5-20 years, are they counted. In Washington, lagoon solids are usually treated on site and land applied.

Washington's sewage sludge incineration facilities are at Vancouver, Lynnwood, Edmonds, Bellingham, and Anacortes. Bellingham has two multiple hearth incinerators that were operating in 2018 but will be replaced with anaerobic digestion in the early 2020s, at a cost of possibly more than \$100 million. Edmonds is looking at an alternative pyrolysis system; their incinerator is going to need major upgrades, and cost is a driver. Their property is so small that they can't go with digesters or a system that has a larger footprint.

### Discrepancies with U.S. EPA electronic data (ECHO)

Washington's 2018 biosolids data present a useful comparison between what are reported to U.S. EPA electronically as required by federal regulations (40 CFR Part 503) and data compiled by the Department of Ecology. The EPA ECHO database includes 71 Washington WRRFs reporting biosolids data in 2018, and the total mass adds up to 131,512 dry U.S. tons. In comparison, Ecology sets the total mass of biosolids used or disposed in 2018 at 105,900 dry U.S. tons. What causes the discrepancy?

Both data sets are comprehensive, with all the larger WRRFs accounted for. The difference may be that EPA requests solids *production* tonnages, which may not be the same as the tonnages used or disposed, which is what NBDP is reporting. For example, in some cases, the EPA data include solids that are sent to another facility for processing or into a storage lagoon. In addition, because it is a relatively new and somewhat complicated system, the ECHO biosolids data may contain data-entry errors. The NBDP project team decided, in this case, to rely on the data compiled by the expert state biosolids coordinator, with his many years of experience.

### Washington has abundant biosolids support & information

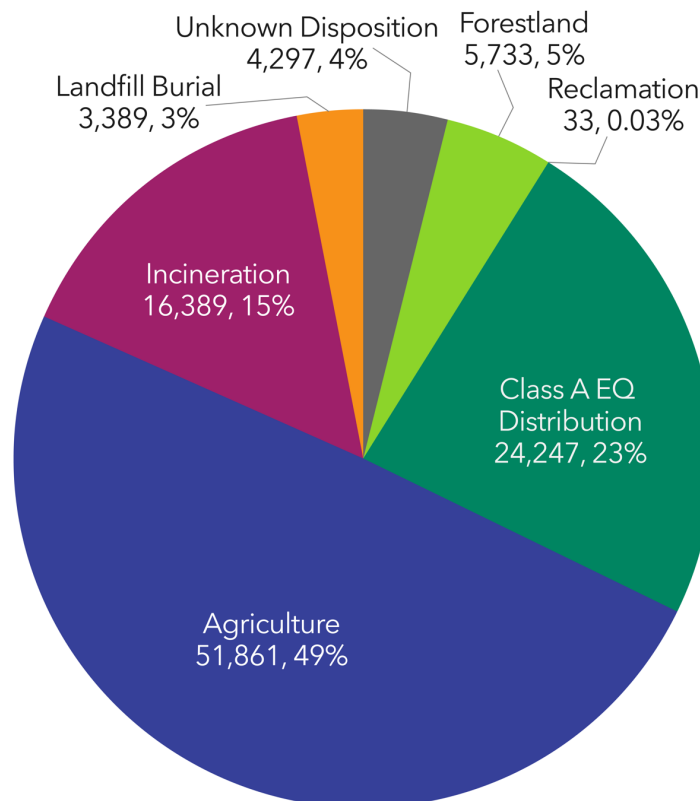
Washington has the most robust, supported biosolids recycling systems in North America. In addition to the leadership that King County and Tagro provide (more details below), and in addition to the state mandate for biosolids recycling from the Legislature, the following diverse organizations provide technical, regulatory, legal, and practical support for biosolids:

- WA Department of Ecology: <https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Biosolids>
- Washington State University: <https://puyallup.wsu.edu/soils/biosolids/>
- University of Washington: [http://faculty.washington.edu/slb/biosolids\\_basics.html](http://faculty.washington.edu/slb/biosolids_basics.html)
- Northwest Biosolids: <https://nwbiosolids.org/>

The details of biosolids management in Washington (and in the west in general) are managed, to a large extent, by WRRF staff. In contrast, in the Northeastern U.S. most of the expertise in biosolids management is in private biosolids management companies. Some Washington biosolids are managed by private companies (e.g. Tribeca, formerly Parker Ag, and Synagro, which operated a compost facility for King County). More biosolids are hauled by private contractors, but many are managed by WRRF staff, who take great pride in the quality of the biosolids they produce.

A notable kind of business enterprise found in Washington and Oregon is the biosolids broker: a public/private partnership where biosolids from different WRRFs are sent to a centralized ranch or farm that serves as a regional distributor. Boulder Park and Natural Selection Farms are two major biosolids brokers and distributors in eastern Washington. Boulder Park is a partnership between Boulder Park Inc. (BPI) and King County (Seattle area). Each year, it takes in and land applies on area farms about 80,000 wet tons of King County biosolids (83,542 wt in 2018) and 40,000 wet tons of biosolids from another ~30 WRRFs (38,596 wt in 2018). About 90,000 acres are permitted for BPI operations, involving more than 100 farmers and landowners in Douglas County and other parts of the state. In 2018, biosolids managed by Boulder Park were applied to 10,015 acres. Crops grown are mostly winter wheat, with smaller acreages of canola, triticale, sunflowers, and hay. BPI tracks every load delivered, knows where it is applied. It's an impressive operation that has been in business since 1992.

**Washington Biosolids Use & Disposal 2018**  
 (dry US tons, %)  
 Total: 105,900



## State Regulations and Permitting

The Department of Ecology (Ecology), through its solid waste division, is the primary agency regulating the management of biosolids in Washington, helping ensure compliance with the federal EPA 40 CFR Part 503 rule and administering state regulations.

In the 1990s, when the federal biosolids rule (Part 503) was new, Washington pursued delegation from U.S. EPA for implementation of that rule. But Ecology found EPA's expectations too high, with no funding for program implementation, very little indication of flexibility, and little to no benefit for the regulated community or public in Washington. Therefore, Ecology continued its own regulatory program and stopped seeking delegation.

State law requires biosolids be put to a beneficial use – this is unique among state regulations of biosolids in the U.S. Specifically, the “legislature declares that a program shall be established to manage municipal sewage sludge and that the program shall, to the maximum extent possible, ensure that municipal sewage sludge is reused as a beneficial commodity and is managed in a manner that minimizes risk to public health and the environment” ([WA State Legislature RCW 70A.226.005](#)).

Biosolids research has long been a priority in Washington. The Washington State Biosolids Management Guidelines were developed by Ecology in coordination with local research universities – the University of Washington (Seattle) and Washington State University (Puyallup). The research-based guidelines cover biosolids history, use as a soil amendment, effects on soil properties, and matching biosolids nutrients to crop needs.

On its website, Ecology describes its biosolids management and regulatory program as follows: “We regulate biosolids under the state biosolids rule [chapter 173-308 WAC], although we partner with local health districts on a variety of biosolids management issues... Washington’s statewide general permit contains minimum requirements that all biosolids facilities must meet. The general permit is an important component of the state biosolids program because we can increase environmental protections or establish more stringent biosolids management requirements to it on a case-by-case basis, if necessary. The biosolids general permit is active for five years.” A new revision of the general permit rule is in final process as of mid-2021.

The general permit requires site-specific plans for land appliers that look and feel like typical site permits. They require additional public notice. In classic NPDES terms, the plans are like permit modifications. The site-specific plans include information about soils, nutrient management, application rates, set-backs, and more – requirements above and beyond what is required by the federal Part 503 regulations. The state biosolids coordinator notes: “Our site plans are comprehensive, but they do not correlate with the nutrient management plans that are typically prepared by dairies and farms that are part of federal programs. We do, however, require the consideration of all nutrient inputs on a site. So if a farmer uses biosolids and needs to add more nitrogen, that must be approved and accounted for.” Phosphorus is generally not used in setting agronomic rates of application.

In addition, Ecology provides biosolids guidance, as does the Washington State University Extension. Monitoring is done by many programs to aid in efficient operations. Some operations contract for soil or surface water sampling, and one or two sites monitor groundwater. Ecology requires pre-application sampling for pollutants (standard 9 metals) and post-harvest residual nitrate analysis (at sites in western Washington) and pre-application (eastern sites).

One unique feature in Ecology's administration of the state biosolids rule is how the biosolids brokers, like Boulder Park and Natural Selection Farms, are regulated. Ecology explains that "[w]e created a group of facilities called Beneficial Use Facilities. Those are different than land application sites directly managed by a WWTP, or perhaps under a contract with a landowner. BUFs basically wave a flag to say, 'Here we are, we have expertise, we can do everything you desire (except treat), and meet state and federal requirements. Just send your biosolids here for X dollars.' This was an outgrowth from stakeholder input during the 1980s. We made them TWTDS [treatment works treating domestic sewage] by definition under state rules so that we captured them under the permit program."

When it comes to application of biosolids, Ecology discourages different biosolids being applied to the same soil in the same year. Sometimes the biosolids brokers will send biosolids from several WRRFs to one site, but they are kept separate and are applied to different parts of the site. This makes it possible to keep track of whose biosolids went where, without any confusing overlap.

Ecology conducts routine inspections, but does not tally site visits. When they find non-compliance, they issue a Notice of Correction first, which is kind of a warning ticket, but does not qualify as a formal enforcement action. There are a few of these each year, but not a lot, according to Ecology.

Regarding EQ biosolids, Ecology has the following perspective: "We view EQ biosolids as something that is in commerce. If we have questions about something coming from another state, we will inquire." There are no requirements – including close tracking or reporting – for how and where EQ biosolids are used, including those coming from out of state.

### **The Economics of Biosolids in Washington**

Biosolids recycling is a significant economic activity in Washington, just as it is across the nation, as indicated by data provided by the Department of Ecology and WRRFs:

- Washingtonians working specifically on biosolids management total an estimated 500 full-time equivalents (FTEs).
- Septage haulers pay \$0.10 - \$0.30 per gallon of septage discharged at a WRRF.
- Biosolids compost and other EQ biosolids products sell for \$5 - \$30 per cubic yard at numerous locations around the state.
- Farmers in eastern Washington pay \$10 or more per acre for biosolids, saving ~\$30/acre in fertilizer costs. In 2018, the use of King County's biosolids added up to more than \$300,000 in savings for the region's farmers.

### **Pressures on Biosolids Management and Land Application**

The state biosolids coordinator chose the following items from a survey list of pressures on biosolids management in the state.

1. PUBLIC INVOLVEMENT- concerns of neighbors, environmental groups, and others – including, most significantly, “public perceptions about potential environmental impacts – not actual impacts. Otherwise, public involvement is a good thing, when it is rational.”
2. MANAGEMENT ISSUES – the hassle of biosolids recycling/land application
3. COST – disposal options are least expensive
4. AGRICULTURAL ISSUES – declining farmland due to less agriculture or due to development, sprawl, seasonal restrictions, or competition with manures, etc.
5. REGULATIONS ON BENEFICIAL USE – strict EPA and/or state regulation and enforcement

While Washington has long been a leader nationwide in the recycling of biosolids, in recent years it too has experienced some public opposition in a few local instances. The legislative mandate for biosolids recycling has helped the Department of Ecology defend land application in a couple of recent legal battles that involved local county restrictions.

Some jurisdictions have local zoning and land use regulations that address "sewage sludge." Those go back many years to when sewage sludge was all solid waste. Now, sewage sludge is a solid waste in WA, but *biosolids* are designated as a valuable commodity. Ecology won on appeal in superior court, making it clear that a county cannot prohibit biosolids use (e.g. Class B land application) or limit application to sites on arbitrary or capricious criteria. Counties cannot use a local ordinance against biosolids based on solid waste laws – although it does happen, rarely. Usually it is not terribly onerous (although it can be) and people want to get along. Ecology sees no reason for additional local county restrictions, because its regulations are thorough and protective. However, there is growing pressure in some regions for local oversight.

Local research and technical support from scientists at the University of Washington and Washington State has helped ensure minimal risks and maximum benefits. It seems likely that biosolids recycling will continue steadily in the coming years, bolstered by goals to decrease net greenhouse gas emissions and other sustainability initiatives. King County and other WRRFs are working to increase Class A EQ biosolids production, in order to diversify options – Bellingham, for example (see below). And concerns about PFAS – fluorinated compounds that are getting a great deal of attention in many states – are being treated by Ecology through source control and thoughtful consideration in existing chemical action planning, resulting in little disruption of biosolids management.

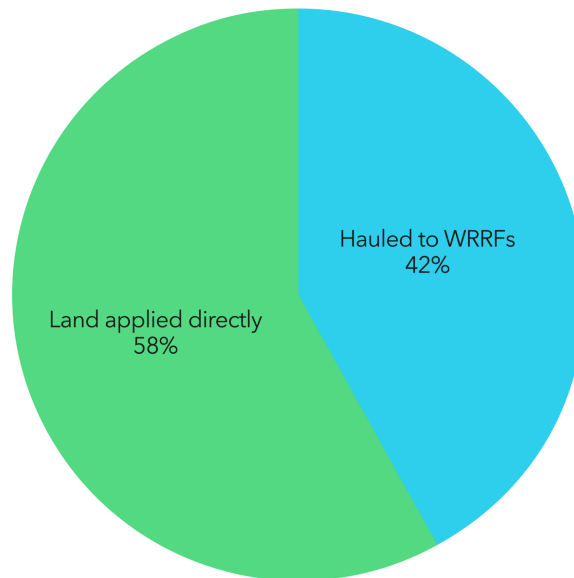
## **Septage Management**

In Washington, septage is covered in the biosolids regulations, as it is under the federal Part 503, and Ecology oversees septage haulers and land application of septage. But, as in most other states, the Department of Health regulates onsite system design and installation and related requirements for septic systems.

An estimated 375 septage haulers operate in Washington, hauling septage to 23 WRRFs that accept septage and 30 separate preparers that take in septage. Most septage (58%) is directly land applied by these separate preparers or individual septage haulers, in accordance with state and federal (Part

503) requirements, usually using alkaline (e.g. lime) stabilization. The remainder (42%) is discharged at WRRFs. See Table 1 for details.

Washington Septage Management 2018  
 (% estimated)  
 Total: 125,700,000 gal



**Table 1. Washington Septage Management**

Quality of state septage data	High
Septage haulers based in state:	375
In-state separate preparers (not WRRFs) taking septage:	30
WRRFs required to take septage?	No
WRRFs that accept septage:	23
Septage received at WRRFs in 2018 (gallons) (see Notes):	125,734,000
Other outside wastes accepted at WRRFs:	-
Is fats/oil/grease (FOG) a significant issue?	No
Is it regulated?	Yes
How?	biosolids/sludge & septage regulations

	Ecology allows up to 25% by volume with septage, managed as septage, and have seen no problem. It is impractical and unrealistic to think that pumpers will or can (easily) separate those services, at least consistently. Solidified grease trap waste by itself is a solid waste.
Is there a proactive program to collect FOG?	no data
Can septage be land applied in state?	Yes
If yes, what treatment is required?	Meet Part 503 and the following additional state requirements:
	Lime stabilization is required. Generally all site management and access restrictions from federal rules are in place regardless - 30 days for livestock even if lime stabilized. Additional state requirements include 100-foot setbacks to wells and surface water, posting of sites, etc. – similar to biosolids requirements. When septage is treated to Class B, it is applied at the agronomic rate rather than using a septage formula, because at that point it is biosolids. This use of agronomic rates may be applied to all septage land application in the future, even that done by individual haulers.
Most recent septage regulations update:	May 2007
Full-time equivalent (FTE) at state agency for septage:	1
<b>Notes:</b>	
In 2018, 16 WRRFs took in 67,115,589 gallons and 7 Separate Treatment Facilities that take septage took in 58,618,403 gallons. These totals do not include septage that went directly to a landfill (rare) or direct to land application by a hauler (using simple lime stabilization). Some septage does go to WRRFs with incinerators. One facility does landfill periodically.	
Corroborating data: NBDP team estimate of septage generation is 125,000,000 gallons if 12.5% of households pumped out in 2018, averaging 1000 gals/tank.	

### Major WWTPs, Separate Preparers, and Notable Projects

The following biosolids operations are leading examples of biosolids management in Washington. Learn more about each one by clicking to selected web resources in the References section, below.

- **King County (Seattle area)** has three WRRFs – West Point (81 MGD average daily flow in 2018), South (64 MGD), and Brightwater (16 MGD), and there are ~35 full-time equivalent (FTEs) staff working on biosolids management. Wastewater solids are treated to Class B standards by anaerobic digestion. Almost all of the Class B biosolids are transported to eastern



Washington and land applied on farms, mostly in Douglas County, through the Boulder Park operation (see above). In 2018, that totaled 25,388 dry U.S. tons.

Silviculture has also long been a use for King County biosolids; in 2018, 4,988 dry U.S. tons were applied in forest plantations. In 2018, less than 1% of King County's biosolids went to the GroCo composting facility operated by Synagro. That facility has since closed. These Class A biosolids were used by local community gardens, for flowers and food crops, and on turfgrass.

Most notable about King County's biosolids program is its branding: "Loop" is the biosolids ingredient used in various ways – as bulk on farms and forests or as compost or other soil amendments. In the 2010s, when the "Loop" brand was introduced, it quickly became recognized nationally as a new and innovative communications and marketing approach that others, such as Washington, DC, mimicked. See <https://www.loopforyoursoil.com/> for some of the best videos, graphics, and stories about biosolids anywhere.

In 2018, the cost per wet U.S. ton for Class B King County biosolids going to land application was \$22. The cost to go to composting was \$55/wet U.S. ton. Loop compost sold to brokers for \$15/cubic yard, with a retail price of up to \$35/cubic yard.

Another major resource that King County recovers is energy. In 2018, the county's WRRFs produced 64.44 million megajoules (17,900 megawatt hours) of electricity from biogas. Biogas from the South WRRF was upgraded to pipeline quality and added to the region's natural gas pipeline system; this renewable natural gas (RNG) totaled 281 million MJ (78.055 megawatt hours) in 2018.

- **Tacoma** is a recognized nationwide leader in biosolids quality and has been for many years. Tagro products sell out every year and are priced from \$10 - \$30 per cubic yard (Tacoma residents pay the lower price). Tagro is used throughout the region in community and home gardens, for landscaping, and on lawns, forests, and farms. As its website notes, "[i]n addition to our satisfied customers and hundreds of blue ribbons from the Puyallup Fair for vegetables grown in TAGRO, Tacoma has won awards from the EPA for its odor-free TAGRO Potting Soil product and for the best biosolids recycling program in the country." Tagro's exceptional quality (EQ) product is achieved through a dual digestion process: thermal aerobic digestion followed by anaerobic digestion with three temperature stages. The result is a highly stable, low-odor EQ biosolids, much of which is mixed with sand, sawdust, bark and/or other materials to produce specific products, such as potting mix and topsoil.
- **Spokane** is the largest city in eastern Washington, the dry side of the state. Its Riverside Park Water Reclamation Facility treats about 34 MGD and produces about 6,500 wet tons of Class B biosolids annually. The biosolids are applied to area farm fields to grow animal feed. In 2018, concerns about trace pollutants in biosolids led to consideration of sending Spokane's wastewater solids to the local trash-to-energy incinerator, to be burned along with municipal solid waste. But no changes were made.

Outside Spokane, the Spokane County Regional Water Reclamation Facility, built in 2012, processes ~8 MGD and sends its solids to the Barr-Tech composting facility.

- **La Conner**, a small town on the Puget Sound near the farming region of the Skagit Valley north of Seattle, is acclaimed for its biosolids composting operation, which started in the mid-1990s. It won the Northwest Biosolids' Excellence in Biosolids Management award in 2012. The facility, which treats ~0.5 MGD and takes in a lot of septage, adds to its composting process solids from other WRRFs in the area and yard and leaf waste. The compost sells for \$5 to \$13/cubic yard.
- At **Vancouver**, on the Columbia River at the southern edge of Washington, the Westside Wastewater Treatment Facility incinerated all of its solids in 2018, a total of 7,584 dry U.S. tons, and the ash was hauled to a local landfill.
- "**Bellingham** has embarked on a project to fundamentally change the way their biosolids are managed," according to Northwest Biosolids. "Through this defining shift, the City will move away from incineration, transforming the Post Point Treatment Plant to a resource recovery facility. The current incineration system is aging, expensive to repair, and incinerates – rather than recovers – reusable resources. Additionally, the current solids handling system only has limited capacity for long-term growth and is subject to increasingly stringent air quality regulations." The plan, which is in predesign in 2021, is for anaerobic digestion followed by composting to produce Class A EQ products. Biogas will likely be upgraded to pipeline quality and fed into the area natural gas system. "It was important to the stakeholders to develop a Class A program to maximize future flexibility and provide access to a local renewable soil amendment/fertilizer product."

## References

The state biosolids coordinator and other state biosolids experts provided most of the information in this summary report. Additional information was obtained from:

### Department of Ecology:

<https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Biosolids>

**Bellingham story:** <https://nwbiosolids.org/whats-happening/member-spotlight/2020/october/membership-spotlight>

### Boulder Park Inc.

[https://kingcounty.gov/~media/services/environment/wastewater/resource-recovery/docs/biosolids/2018\\_Loop-Boulder-Park-Report.ashx?la=en](https://kingcounty.gov/~media/services/environment/wastewater/resource-recovery/docs/biosolids/2018_Loop-Boulder-Park-Report.ashx?la=en)

<https://www.youtube.com/watch?v=SahmS0rD-w0> , <https://www.youtube.com/watch?v=gGPvj4tJCE>

### King County:

[https://kingcounty.gov/~media/services/environment/wastewater/resource-recovery/plans/1711\\_KC-WTD-Biosolids-2018-2037-Strategic-Plan-rev2.ashx?la=en](https://kingcounty.gov/~media/services/environment/wastewater/resource-recovery/plans/1711_KC-WTD-Biosolids-2018-2037-Strategic-Plan-rev2.ashx?la=en)

<https://www.loopforyoursoil.com/>

### La Conner:

[https://www.tpomag.com/editorial/2014/09/small\\_town\\_washington\\_treatment\\_plant\\_uses\\_biosolids\\_to\\_create](https://www.tpomag.com/editorial/2014/09/small_town_washington_treatment_plant_uses_biosolids_to_create)

### Natural Selection Farms

<https://www.naturalselectionfarms.com/>

**NW Biosolids regarding state biosolids coordinator Kyle Dorsey:** <https://nwbiosolids.org/whats-happening/legislative-action/2020/november/regulations-spotlight>

**Spokane:**

<https://www.spokanecounty.org/1117/Biosolids-Management>

<https://www.barr-tech.net/aboutus/>

**Tagro:**

<https://www.cityoftacoma.org/cms/one.aspx?pageId=16884>

[https://www.cityoftacoma.org/government/city\\_departments/environmentalservices/tagro/tagro\\_safety](https://www.cityoftacoma.org/government/city_departments/environmentalservices/tagro/tagro_safety)

<https://www.youtube.com/watch?v=3k-zLe4Wn4I> (Urban Green community gardens & Tagro video)

[https://www.tpomag.com/editorial/2012/06/keeps\\_getting\\_better](https://www.tpomag.com/editorial/2012/06/keeps_getting_better)