

On the detailed survey, facilities operating flow-through and recirculating production systems reported a variety of BMPs that are used today. These BMPs include:

- Feed management.
- Cleaning of quiescent zones.
- Inventory control.
- Health screening.
- Cleaning screens in tanks or raceways.
- Mortality removal.
- Use of dam boards.
- Flow diversion during harvest and cleaning activities.

The detailed survey did not ask for detailed descriptions of the steps in the BMPs. Therefore, except for the feed management practice (see below), when a facility indicated a particular BMP in place, EPA assumed no additional cost to the facility for implementing that BMP.

The costs associated with BMP plan development include a one-time labor cost of 40 hours to develop and write the plan. The plan that EPA costed included (1) identifying all waste streams, wastewater structures, and wastewater and manure treatment structures at the site, (2) identifying and documenting standard operating procedures for all BMPs used at the facility, and (3) management and staff responsibilities for implementing the plan. We included an annual cost for four hours of management labor to maintain the plan and eight hours of management labor for an annual review of BMP performance. We included the cost of developing a solids control and drugs and chemicals BMP plan in the estimates for all facilities, except those in Idaho and Washington. (Facilities in Idaho and Washington would not incur this cost because NPDES permits in these States already require solids control and drugs and chemicals BMP plans.) EPA found that the components of the BMP plans required in Idaho and Washington are similar to those being considered for the final rule.

In evaluating facilities for solids controls, EPA first checked for evidence of a good feed management program. If the facility reported they practice feed management, EPA looked for evidence of solids management and good operation of the physical plant, including regular cleaning and maintenance of feed equipment and solids collection devices (*e.g.*, quiescent zones, sedimentation basins, screens, etc.). To evaluate the effectiveness of a facility's solids control practices, we calculated feed conversion ratios (FCRs) using pounds of feed per pound of live product (as reported in the detailed

survey) and considered existing solids control equipment. We assumed facilities lacking evidence of good feed management or solids control programs would incur additional costs to improve or establish them.

EPA estimated FCRs from data in the detailed survey and follow-up with some facilities and compared FCRs for groups of facilities (*i.e.*, combinations of ownership, species and production system types such as commercial trout flow-through facilities or government salmon flow-through facilities). We found a wide range of FCRs (reported by facilities in their detailed surveys, which were validated by call backs to the facility) among apparently similar facilities within ownership-species-production system groupings.

For example, we had good data for 24 of 60 government trout producers using flow-through systems. They reported a range of FCRs of 0.79 to 1.80 with a median FCR of 1.30. If an individual facility's reported FCR was significantly greater than the median, EPA further evaluated the facility to ascertain the reason for the higher FCR. Facilities that produce larger fish, such as broodstock, might have higher FCRs because the larger fish produce less flesh per unit of food. Facilities with fluctuating water temperatures could also be less efficient than facilities with constant water temperatures. We did not apply costs for solids control BMPs for facilities with reasonable explanations for the higher FCRs. We evaluated facilities that did not report FCRs or provide enough data for an estimate using the methodology described in section III.H.

Costs for the solids control BMP component include staff time for recordkeeping for feed delivery and daily feeding observations. Management activities associated with the solids control plan were weekly data reviews of feeding records, regular estimates of changes to feeding regimes for each group of aquatic animals, and staff consultations about feeding. For facilities with no solids control equipment, we also estimated the costs for primary and secondary solids control. EPA evaluated each facility to identify the configuration of the existing treatment units and what upgrades would be required. We found that most flow-through systems not having any treatment structures can comply with Option 1 by adding a combination of quiescent zones and off-line settling basins. We assume quiescent zones can be retrofitted into existing raceways without expanding them and without impacting production levels in the raceways.

EPA also used industry cost information provided through public comment and the detailed survey to estimate costs for design and installation of primary settling equipment for effective settling of suspended solids. For example, we used the facility-level data included in the detailed survey responses to place and size the off-line settling basins on the facility site. For facilities that use earthen flow-through technologies, EPA estimated costs to construct and operate full flow settling structures rather than quiescent zones and off-line settling.

EPA classified each facility's wastewater treatment system based on the description provided in its survey response and available monitoring data, including DMR data. We assumed that treatment technologies indicated by a facility on the detailed survey are properly sized, installed, and maintained. EPA estimated facility-specific costs for each of the responding direct dischargers and used these estimates as the basis for national estimates. Because the survey did not collect information about many specific parameters used in individual facilities' production processes and treatment systems, EPA supplemented the facility-specific information with typical specifications or parameters from literature, survey results, and industry comments. For example, EPA assumed that facilities have pipes of typical sizes for their operations.

As a consequence of such assumptions, a particular facility might need a different engineering configuration from those modeled if it installed equipment that varies from the equipment or specifications we used to estimate costs. EPA nonetheless considers that costs for these facilities are generally accurate and representative, especially industry-wide. EPA applied typical specifications and parameters representative of the industry to a range of processes and treatment systems. We contacted facilities to get site-specific configuration information where possible.

In revising cost estimates, EPA paid particular attention to:

- Size of tanks, raceways, and culture units.
- Labor rates.
- Treatment components in place.
- BMPs and plans in place.
- Daily operations at the facility.

Site visits and analysis of the detailed surveys indicated that raceways and quiescent zones are cleaned as necessary to maintain system process water quality.