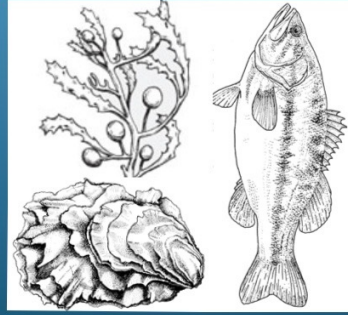


Oregon Aquaculture

Sustainable Harvests
Quality foods



Users Guide:

A snapshot of the processes to follow to start an aqua farming business in Oregon

Aqua farming is one of the fastest food-producing sectors in the world; two-thirds of aquatic products consumed worldwide predicted to come from farms by 2030. Aquatic farming systems cover over 600 organisms including fishes, shellfish, crustaceans, other invertebrates as well as aquatic plants and algae. In 2012 (FAO), world aquaculture production was estimated at 90.4 million tons worth \$144.4 billion (the corresponding figure for global capture production 93.7 million tons).

There are twin entry points for the investor interested in starting an aquaculture business: local government and the Oregon Department of Agriculture (ODA). Local government will be the municipal or county planning authority, which ever applies. At ODA, the contact is Business Development Manager/Aquaculture, Oregon Department of Agriculture, Food Innovation Center, 1207 NW Naito Parkway, Portland, OR 97209 (503)872-6608.

Navigating the labyrinth

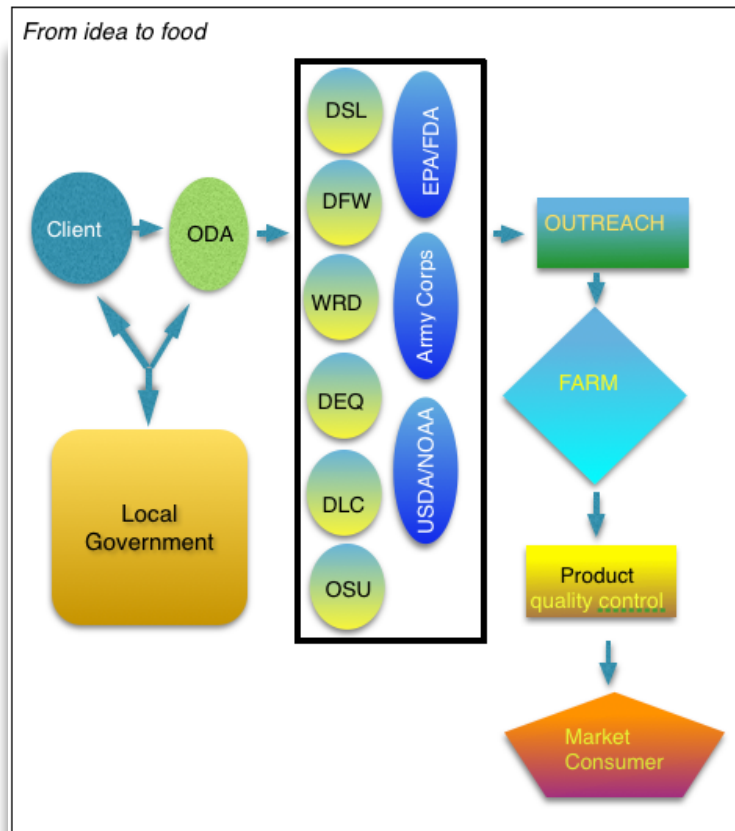
The process may appear daunting. However, when boiled down, the people and offices involved in starting an aquaculture business are asking a series of basic questions: Is aquaculture an approved **use** for the site you have chosen? Is the **crop** you wish to raise approved in Oregon? What **controls** apply to raising and marketing this crop?

The **use** will initially be based on local planning measures in place. In the case of wishing to build on public lands, the immediate authority will need to be identified: county, city, port authority, tribal lands or state lands.

The United States reports (2013) a total of 3,093 aqua farms producing a harvest valued at \$1.3 billion: \$732M of which comes from food fish farming and \$328M from shellfish farming (USDA).

Once, at local level, it has been determined that, with subsequent approvals, the site could be used for aquaculture, it is necessary to initiate state level processes. In some cases, local authorities may immediately defer to the state, putting local approval on hold until after state review. The state point of entry is the ODA office cited above. Through this portal, contacts with other public entities will be made as needed as seen in the schematic below¹.

Starting: government offices involved in aquaculture



What crop to grow?

Before entering into the processes outlined above, the investor must identify the crop and the technologies to be used to raise this crop. Most investors have an initial idea of what they would like to grow. The first test of this idea is to determine if it is marketable. Thus, the very first step is to undertake a **market survey** determining if there is a market for this crop — what size and quality of product, how much as well as when and where this must

The market is key. Invest in what consumers want. Do not forget export opportunities,

¹ Acronyms: DSL – Department of State Lands, DFW – Department of Fisheries and Wildlife, WRD – Water Resources Department, DEQ – Department of Environmental Quality, DLC – Department of Land Conservation and Development, OSU – Oregon State University, USDA – United States Department of Agriculture, NOAA – National Oceanic and Atmospheric Administration, EPA – United States Environmental Protection Agency, FDA – United States Food and Drug Administration.

Aqua farming is a business. You need a comprehensive business plan (<http://seafood.oregonstate.edu/.pdf%20Links/Planning%20for%20Success%20in%20Your%20Aquaculture%20Business.pdf>).

Aqua farming requires water and most often land, energy and skilled labor. The major production input is feed which can be two-thirds of variable costs.

Aqua farming involves many state and federal agencies as well as local government. If uncertain of where to start or who to contact, get in touch with the Oregon Department of Agriculture.

be delivered. The ODA focal point can provide guidance as to where the investor can receive help in preparing this survey.

With a positive outcome, it is necessary to determine what production technologies would be used: e.g., ponds, raceways, tanks, or others; indoors or out; water requirements; feed requirements; etc. With a complete picture of what the new farm would look like, the next step is to undertake a thorough **business plan** to determine if this farm would make a profit. Again, the ODA focal point can help in securing assistance in this task.

Only AFTER a positive market survey and business plan should the investor initial processes aimed at obtaining the necessary approvals and permits to start the enterprise.

What's on the plate?

The aim of all parties is to ensure that high quality, healthy food is put on consumers' plates. Much of the responsibility for insuring this quality falls on the ODA Food Safety Program.

Whose land is it?

Much aqua farming is done on state lands. DSL is the steward of these lands. They are responsible for the use of submersible and submerged lands including estuaries, declared water ways and meander lakes, among others. Coastal ventures falling under the Territorial Sea Plan or coastal management are the auspices of DLC while the Army Corps is involved in oversight for shoreline or in-water developments in navigable waters.

Whose water is it?

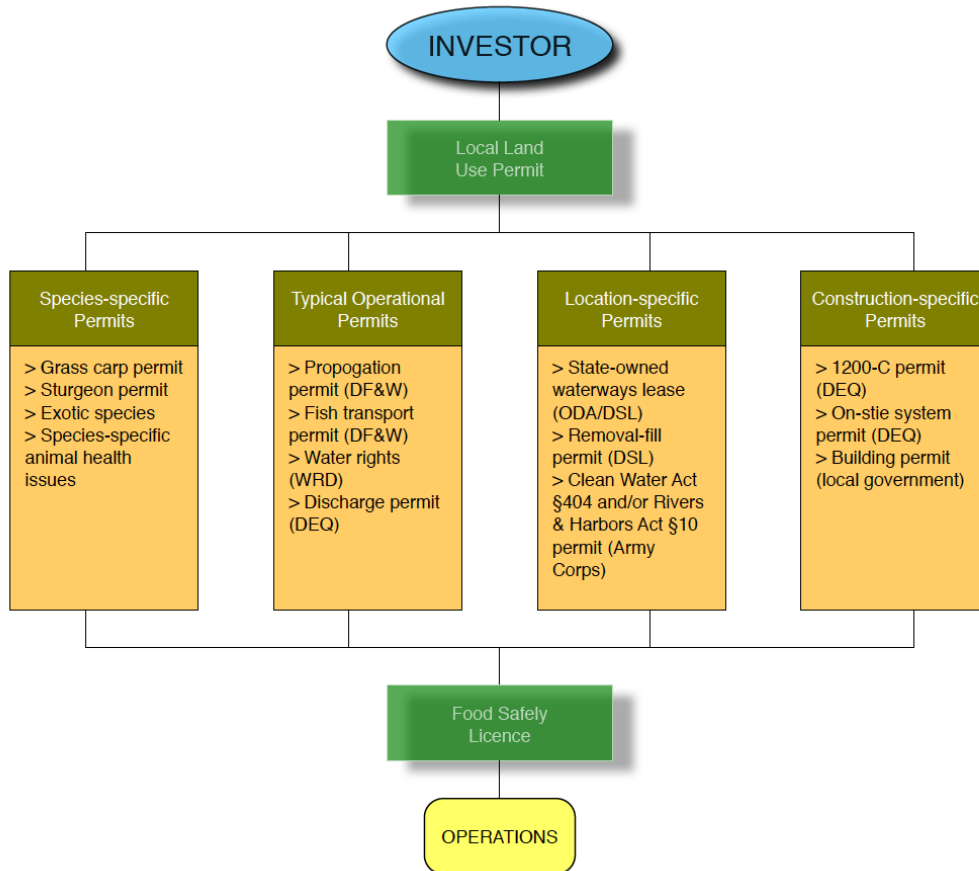
It is everyone's. Thus., water quality matters; water entering the farm and water leaving the farm. Any changes in this quality attributable to the farm will need to be monitored and, as necessary mitigated. WRD is responsible for allocating the State's waters while DEQ assures the continued high quality of these waters. At the same time, ODF&W assures the health of the aquatic ecosystems woven into these waters.

What to do: where to begin

The following flow charts depict the approval and permitting processes for marine and inland enterprises.

Aqua Farming Permitting

Major categories and indicative samples of permits requiring consideration by the new aqua farmer



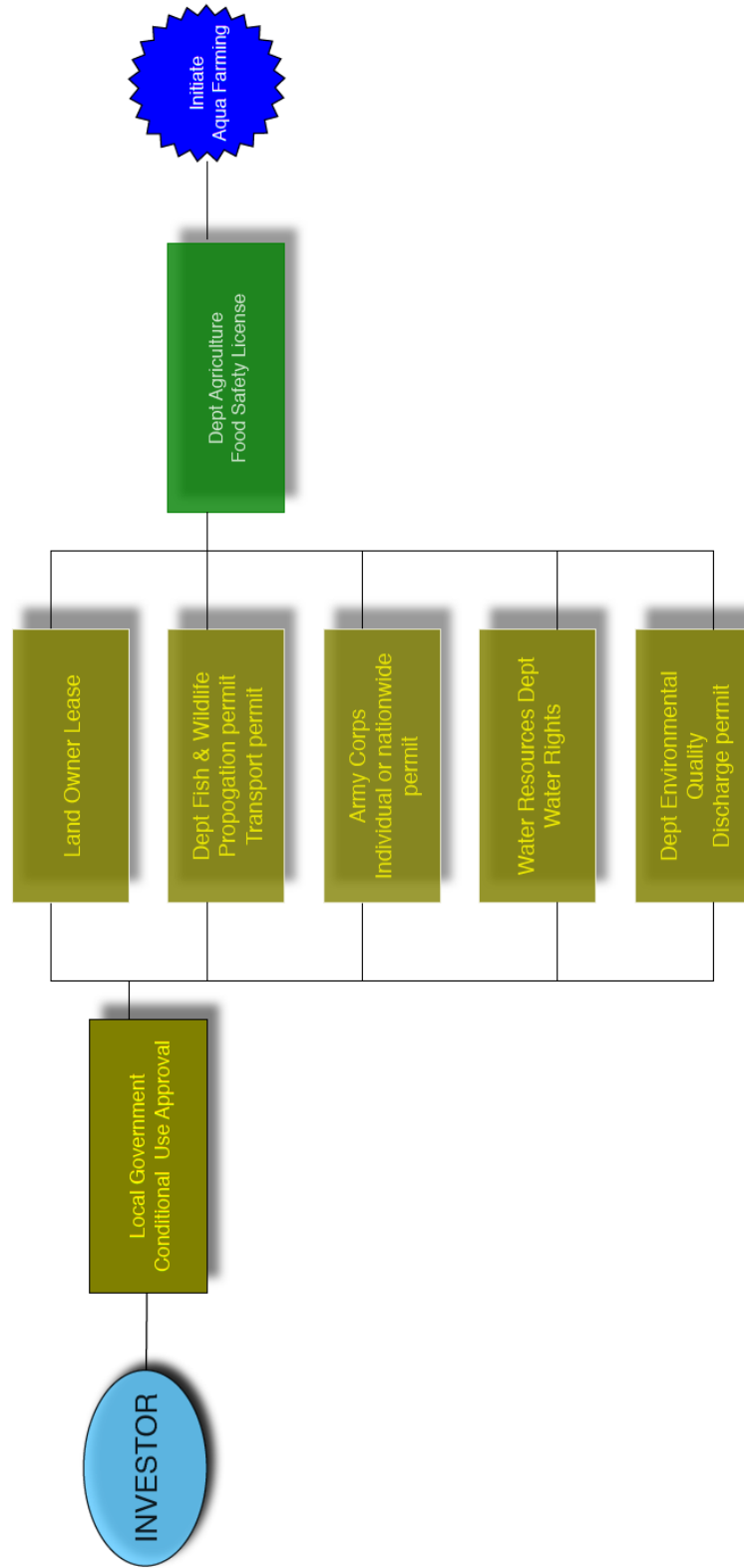
Aquatic products are grown in tanks, raceways, cages/pens, on long lines, on the bottom, suspended on trays, in greenhouses, in open water and in a variety of other ways. It is important to have the right FIT: the production system corresponding to the specific bio-physical and socio-cultural environments such that sustainability and profitability are optimized with minimal ecological footprints.

What type of aqua farming?

The diagram above is generic, applying to most aqua farming businesses. However, each crop and site are specific; unfortunately, there is no one-size-fits-all process for beginning aqua farming. Nevertheless, the basic categories of permitting above apply to most enterprises. Farming state-owned lands and waters is overseen by DSL, in some cases in close collaboration with ODA. As farming tidal waters frequently involves using navigable waterways, both DSL and the Army Corps of Engineers are important actors. Regardless of the type of aquatic farming, it is important to contact state agencies to ensure all requirements are met. In cases such as **aquaponics** farms, operators may have to comply with requirements for both the aquatic and hydroponic crops.

Aqua Farming

Not in wetlands, major waterways or essential salmon habitat and no significant alteration of beds or banks of state waters



“Aquaculture Makes Economic Sense Businesses and consumers benefit

from a more robust U.S. aquaculture industry. Farmers, feed manufacturers, equipment manufacturers, marinas, cold storage facilities, seafood processors, transportation companies, retailers, and restaurants all play a role in getting seafood from the farm to the table” (NOAA).

“Aquaculture Makes Environmental Sense

Environmentally safe, sustainable aquaculture is vital to protecting the environment, as well as human health and safety. Management practices for aquaculture have been developed and refined to ensure U.S. farming operations reduce or mitigate the environmental risks associated with aquaculture” (NOAA http://www.noaa.gov/features/resources_0109/aquaculture.html).

“...a strong management team that has a solid mix of technical expertise and aquaculture business management skills is critical to success” <http://www.fishfarming.com/fishing-solid-returns-few-keys-successful-investments-aquaculture.html>)

“To promote responsible practices across the aquaculture industry, the [Global Aquaculture Alliance](#) coordinates the development of Best Aquaculture Practices (BAP) certification standards for hatcheries, farms, processing facilities and feed mills” (GAA <http://www.aquaculturecertification.org>).

Who does what?

The flow chart on the preceding page indicates the normal sequencing of events, starting at local government, securing the licenses and permits necessary to farm and then addressing food safety IF raising shellfish or processing crops (i.e., sale of live organisms does not require food safety approval).

Well planned aqua farming is GREEN

Aquatic crops are energy efficient. Aquatic farms can be energy, water and land efficient. With good advance planning, an aqua investment is not only profitable, it is an environmental plus and a social plus, providing high quality, healthy foodstuffs.

Where to learn more.....

Aqua farming

- ✦ <http://www.aces.edu/dept/fisheries/aquaculture/docs/AgHandbook.pdf>
- ✦ <http://www.ncagr.gov/markets/aquaculture/Tilapia01.pdf>
- ✦ http://www.extension.org/mediawiki/files/a/a3/Hybrid_Striped_Bass_Pond_Production_of_Foodfish.pdf
- ✦ <http://www.fao.org/docrep/017/i2144e/i2144e.pdf>
- ✦ <http://www.ncagr.gov/markets/aquaculture/Trout01.pdf>
- ✦ <http://aqua.ucdavis.edu/DatabaseRoot/pdf/ASAO-A10.PDF>
- ✦ https://www.extension.org/mediawiki/files/4/4a/Yellow_Perch_Culture_Guide.pdf
- ✦ <http://wsg.washington.edu/mas/pdfs/smallscaleoysterlr.pdf>
- ✦ http://www.spc.int/DigitalLibrary/Doc/FAME/InfoBull/BDM/18/BDM18_18_Chen.pdf
- ✦ http://www.fao.org/fishery/culturedspecies/Cyprinus_carpio/en
- ✦ <http://michiganaquaculture.org/wp-content/uploads/2012/09/20120801-AIM-Roadmap.pdf>
- ✦ <http://www.fao.org/3/content/idea3c92-1faa-47bb-a374-0cf4d9874544/i4021e00.htm>

Aqua business

- ✦ https://www.whitehouse.gov/sites/default/files/microsites/ostp/NSTC/federal_aquaculture_resource_guide_2014.pdf
- ✦ http://indianasoybean.com/images/stories/Workshops/BusinessPlanning/SmallBusinessStartupKit_Final.pdf
- ✦ <http://fisheries.tamu.edu/files/2013/09/SRAC-Publication-No.-4400-Introduction-to-Financial-Management-of-Aquaculture-Businesses.pdf>
- ✦ http://www.researchgate.net/publication/266562239_Commercial_aquaponics_production_and_profitability_Findings_from_an_international_survey
- ✦ <https://www.extension.purdue.edu/extmedia/ec/ec-738-w.pdf>
- ✦ <http://www.ncrac.org/NR/rdonlyres/0A4B5D32-C786-4E99-8F28-FFA99234F0A2/0/TB117.pdf>
- ✦ http://web.vims.edu/adv/mas/GrowerDocs/Business%20Planning/SRAC%204402_Determining%20profitability%20of%20an%20aquaculture%20business.pdf
- ✦ http://www.extension.org/mediawiki/files/9/9a/Tilapia_Farm_Business_Management_nad_Economics,_A_Training_M.pdf