

DIETS		FEED SIZES											PIGMENT	FEATURES & FEEDING RECOMMENDATIONS	
		STARTER CRUMBLES				PELLETS (MM)									
		MASH	#0	#1	#2	1.2	1.5	2.0	2.5	3.0	4.0	6.0	9.0		
STARTER FEED	BioVita Starter (Extruded crumbles) <b>CONTAINS KRILL</b>	53 18	53 18	52 20	52 20									Natural	BioVita Starter is a premium feed with the highest levels of fish meal and fish oil. It contains an enhanced vitamin pack, natural pigment and palatability enhancers to promote healthy fish and natural coloration. Beta-glucans, nucleotides and other functional ingredients are included to promote fish health. This is our highest quality starter feed and it is widely proven as an effective first feeding diet for Pacific Salmon and Trout.
	BioClark's Starter (Extruded crumbles)		53 18	52 20	52 20									Natural	BioClark's Starter uses select alternative ingredients to reduce cost and to promote sustainability. It contains an enhanced vitamin pack and natural pigment to promote healthy fish and natural coloration. This is our lowest cost starter feed.
FRY FEED	BioVita Fry					50 22	50 22	50 22	50 22	50 22				Natural	BioVita Fry is a premium fish feed for rearing fry, fingerling, and Juvenile Salmon and Trout. Along with high levels of fish meal and fish oil, it contains an enhanced vitamin pack and natural pigment to promote healthy fish and natural coloration. Beta-glucans are included to stimulate the immune system, counter-act stress, and enhance palatability.
	BioClark's Fry					47 18	47 18	47 18	47 18	47 18				Natural	BioClark's Fry is a mid-level energy fish feed for moderate or controlled growth. It uses select alternative raw materials to reduce costs and promote sustainability. It also contains an enhanced vitamin pack and natural pigment to ensure all the nutritional requirements of your fish are met.
TROUT FEED	BioTrout **							47 24	47 24	45 24	43 24	40 24		Astaxanthin **	BioTrout is a high-energy Trout and Steelhead diet designed to provide maximum growth and low feed conversion rates. BioTrout utilizes Aminobalance™ to ensure that the maximum amount of valuable dietary protein is used for muscle growth, and the least amount possible is deposited as fat or broken down to form nitrogenous waste products.
BROOD FEED	BioBrood									48 20	48 20	48 20		Astaxanthin	BioBrood has been specially designed to meet the needs of developing and maturing eggs and sperm. It has been formulated with high-quality marine fish oils and high-levels of digestible protein from premium fishmeal. The lipid content has been carefully balanced to optimize gonad development and facilitate the spawning process.
SPECIALTY FEED *	BioPro (Health promoting diet) <b>SIZES #0, #1, &amp; #2 CONTAIN KRILL</b>		53 18	52 20	52 20	50 22	50 22	50 22	50 22					Natural	BioPro is a health promoting diet formulated for freshwater Salmon, Steelhead and Trout. This diet helps your fish overcome stressful situations, such as adverse environmental conditions or periods of known disease risk. For more information, take a look at our Feature Products.
	BioSupreme (Transfer diet)					* 50 20	* 50 20	50 20	50 20					Natural	BioSupreme has been formulated to prepare Salmon for the transition from fresh to saltwater. This diet contains salt and functional ingredients that are essential for the smoltification process, as well as increased feed intake and fish growth.
	BioDry 1000LP *** (Low phosphorus diet)							50 18	50 18	50 18				None	BioDry 1000LP is an extruded, low-phosphorus fish feed that has been formulated to reduce the amount of phosphorus discharged from hatcheries into the surrounding environment. This diet contains less than 1% dietary phosphorus.

\* Specialty feeds require longer order lead times or minimum order quantities (e.g., BioDry 1000LP requires a minimum order quantity when the product is not in stock).  
 \*\* 40 ppm Astaxanthin pigment is available in BioTrout 4.0 mm, and it is always included in BioTrout 6.0 and 9.0 mm.  
 \*\*\* BioDry 1000LP requires a 6 week lead time, and requires a minimum order of 2200 lbs.



# Chinook, Coho, Steelhead, and Trout Feed Size & Feed Rate Guidelines

Feed Size	Feed Type	Grams	# of Fish per lb.	Fish Length-inch	TEMP.		Feed Rate: % of Fish Biomass/day
					°F	°C	
12.0	Pellet	> 2270	< 0.2	> 22	36	2	0.07
9.0	Pellet	908 - 2270	0.5 - 0.2	16 - 22	39	4	0.10
6.0	Pellet	454 - 908	1 - 0.5	12.5 - 16	43	6	0.25
4.0	Pellet	75 - 454	6 - 1	7.4 - 12.5	46	8	0.35
3.0	Pellet	40 - 75	11 - 6	6.0 - 7.4	50	10	0.45
2.5	Pellet	18 - 40	25 - 11	4.6 - 6.0	54	12	0.60
2.0	Pellet	8.0 - 18	60 - 25	3.5 - 4.6	57	14	0.70
1.5	Pellet	5.0 - 8.0	90 - 60	3.1 - 3.5	61	16	0.90
1.2	Pellet	3.0 - 5.0	150 - 90	2.6 - 3.1	64	18	0.90
#2 0.8-1.4	Crumble	1.5 - 3.0	300 - 150	2.1 - 2.6			4.7
#1 0.4-1.0	Crumble	0.8 - 1.5	570 - 300	1.7 - 2.1			5.0
#0 0.03-0.06	Crumble	0.15 - 0.8	3000 - 570	hatch - 1.7			5.2
Mash .02-.04	Crumble	<0.15	>3000	hatch			5.5



\*As feeding strategies vary greatly between species, sites, and hatchery personnel, it is recommended that you use a strategy based on your own experience which will best meet your program goals. The above chart is based on literature reviews and interviews with experienced fish culturists, and is provided as a guide only. Bio-Oregon makes no guarantees related to these guidelines. Our staff is available for consultation regarding site specific guidelines.

# Krill Returns to BioVita & BioPro Starters



**BioVita Starter (sizes Mash, #0, #1, #2) and BioPro Starter (sizes #0, #1, #2) will again contain krill.**

Krill is rich in protein, omega-3 phospholipids, astaxanthin, vitamins and minerals. It acts as a feeding stimulant for salmonids that increases feed uptake and enhances growth. Fish like the taste of krill and eat more feed when it contains krill.

Krill in salmonid diets has been shown to improve feed uptake, provide faster growth, and to support the immune system.

Bio-Oregon sources krill only from Marine Stewardship Council (MSC) certified fisheries, which meet the most stringent sustainability standards.



## Specialty Products

### BIOPRO

BioPro is our Best-Selling Health Diet for Skin Health, Gut Health & Immune System Support. BioPro is a health promoting feed designed to be fed leading up to stressful events, adverse environmental conditions and periods of high disease risk. BioPro contains Beta-glucans, nucleotides, elevated levels of vitamins and minerals, and special functional ingredients that work to promote improved fish health.

#### BioPro Feeding Recommendations:

- Feed BioPro for 2 weeks prior, and 2 weeks following stressful events such as grading, transport, vaccination, or adverse environmental conditions.
- Feed BioPro for 4 weeks prior to the onset of known periods of increased disease risk and feed it for 4 - 6 weeks following these periods.
- BioPro can be fed continuously over extended periods of time for maximum protection.

### BIOSUPREME

BioSupreme is formulated with salt and newly discovered functional ingredients that help prepare salmon and steelhead for the transition from freshwater to saltwater.

#### BioSupreme Feeding Recommendations:

- For freshwater reared enhancement salmon and steelhead, feed BioSupreme for 6 weeks prior to release from the hatchery.
- For salmon being transferred to saltwater net pens, feed BioSupreme for 6 weeks prior to transfer and for 4 to 6 weeks after transfer.

### FEED STORAGE & SHELF LIFE RECOMMENDATIONS

Fish feed should be stored in a cool, dry place. When properly stored, the nutritional content of our standard diets (including starter feeds) are guaranteed for 12-months from the date of manufacture. Feeds with higher levels of pigment (i.e. BioTrout with 40 ppm Astaxanthin & BioBrood) are guaranteed for 6-months.

### GENERAL RULES FOR FEEDING FISH

- When feeding starter diets to first feeding fish, ensure the feed is equally distributed and feed to satiation.
- Select a feed size to accommodate the smallest fish of a population.
- When feeding a restricted ration, feed a smaller feed size to ensure equal distribution of feed and to reduce fish size variation.

# Useful Calculations & Conversions

### Feed Conversion Ratio - FCR

The efficiency at which fish convert feed to growth, normally expressed as a decimal.

$$FCR = \text{Feed Given} \div \text{Fish Weight Gained}$$

Example:  $800 \text{ lbs Feed Given} \div 1000 \text{ lbs of Fish Weight Gained}$   
 $FCR = 0.8$

### Temperature Units - TU's

Number of degrees above freezing for one 24 hour period

$$TU's = \text{Water Temp } ^\circ F - 32^\circ F$$

Example:  $\text{Water temperature at } 48^\circ F$   
 $48^\circ F - 32^\circ F \text{ per 24 hours}$   
 $TU's = 16^\circ F$

### Calculating Biomass - BioM

The total mass of swimming fish per unit expressed as lbs. (or kgs)

$$BioM = \text{Number of Fish} \times \text{Average weight of Fish}$$

### Daily Feed Ration - DFR

$$DFR = \text{Total Biomass} \times \text{Feed Rate (\%BW/D)}$$

Example: *A pond contains 2000 lbs. of fish Biomass, and using the Feeding Guidelines chart the suggested Feed Rate is determined to be 2.0% Body Weight per Day (%BW/D).*

$$2000 \text{ lbs fish} \times 0.02$$

$$\text{Daily Feed Ration} = 40 \text{ lbs. Feed / Day}$$

### Degree Days - DGRD

$$DGRD = \text{Number of Days} \times \text{Average Water Temp}$$

### Temperature Conversion

Fahrenheit to Celsius

$$^\circ C = (^\circ F - 32) \times 5/9$$

Celsius to Fahrenheit

$$^\circ F = (9/5 \times ^\circ C) + 32$$

°C / °F Conversion	
°C	°F
-20	-4
-15	5
-10	14
-5	23
0	32
5	41
10	50
15	59
20	68
25	77
30	86
35	95
40	104

### Calculating Multiple Days Ration - MDR

$$MDR = (\text{Total Biomass} \times \%BW/D) \times \text{Number of Days}$$

Fish Weight	
Grams	FPP
0.1	4540
0.2	2270
0.5	908
1.0	454
5.0	91
10.0	45
454	1.0
1000	0.5
2000	0.2

### Fish Size

Converting between Grams (g) and Fish Per Pound (FPP)

$$\text{Fish Weight (g)} = \frac{454}{FPP}$$

$$FPP = \frac{454}{\text{Fish Weight (g)}}$$

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Krill Returns to  
**BioVita Starter & BioPro Starter**  
 For Enhanced Palatability

# Lifestage Diets for Fish®