Summary of the Biome Generation in Minecraft 1.7 - 1.12

Cubitect

March 17, 2018

Abstract

This document is designed to provide an overview of how Minecraft biome generation works and how we may efficiently find seeds with desired properties.

Contents

1 Biome Generator Layers **3**

1.0 Seed Finding . . . 3
1.1 Layer 1: Island . . . 5
1.2 Layer 2: Zoom . . . 5
1.3 Layer 3: Add Island . . . 5
1.4 Layer 4: Zoom . . . 5
1.5 Layer 5: Add Island . . . 5
1.6 Layer 6: Add Island . . . 5
1.7 Layer 7: Add Island . . . 6
1.8 Layer 8: Remove Too Much Ocean . . . 6
1.9 Layer 9: Add Snow . . . 6
1.10 Layer 10: Add Island . . . 6
1.11 Layer 11: Edge, Cool/Warm . . . 6
1.12 Layer 12: Edge, Heat/Ice . . . 7
1.13 Layer 13: Edge, Special . . . 7
1.14 Layer 14: Zoom . . . 7
1.15 Layer 15: Zoom . . . 8
1.16 Layer 16: Add Island . . . 8
1.17 Layer 17: Add Mushroom Island . . . 9
1.18 Layer 18: Deep Ocean . . . 10
1.19 Layer 19: Biome . . . 10
1.20 Layer 20: Zoom . . . 12
1.21 Layer 21: Zoom . . . 12
1.22 Layer 22: Biome Edge . . . 13
1.23 Layer 23: River Init . . . 13
1.24 Layer 24: Zoom . . . 14
1.25 Layer 25: Zoom . . . 14
1.26 Layer 26: Hills . . . 14
1.27 Layer 27: Rare Biome . . . 16
1.28 Layer 31: Shore . . . 17
1.29 Layer 41: River . . . 18
1.30 Layer 43: River Mix . . . 19
1.31 Layer 44: Voronoi Zoom . . . 21

1 Biome Generator Layers

Minecraft biome generation occurs in layers. Many of these layers are chained together inside the generator, such that the output from one becomes the input for the next. A flowchart of this can be found on the next page.

Each layer applies certain modifications to a map of integers, which change their use throughout the generation process. Initially the map only contains values 0 or 1, representing ocean or land masses. Later in the generator they represent temperature categories, until they are finally replaced by the actual biome IDs.

Some of the layers resize the output of the previous layer. These Zoom-layers therefore change how much area is represented by a map entry. I will refer to this as "scale". For instance, 1:256 should be read as: one map entry ends up as an area of 256x256 blocks in the world.

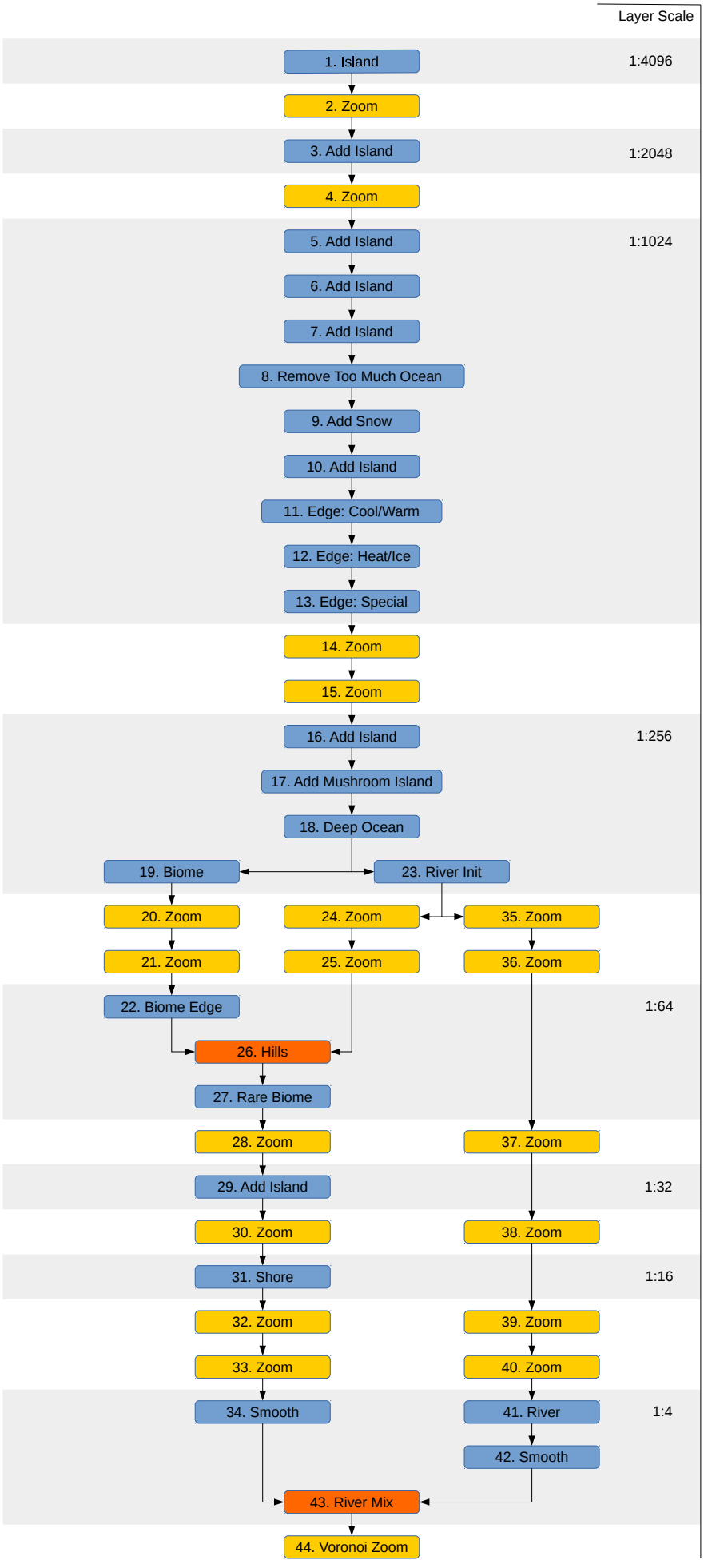
1.0 Seed Finding

When constructing a seed finder, it may be useful to stop the generation at an earlier layer. For example if we require a swamp to be located near a given position, then we might want to generate up to layer 19: Biome first, and then check on a 1:256 scale if there is a swamp in the area. This is not enough to confirm that there will be a swamp at the given position, but we can rule out seeds that definitely don't have a swamp anywhere near the area. If the seed passes this cheap test, then we can go through the full expensive generation process and directly check the position for a swamp.

Usually it is not practical to continue the search from a terminated generation and we have to start over again. The reason for this is that most layers require an additional 1 wide boarder from the previous layer, so the map sizes don't match up.

Another more involved, but very powerful way of creating early knock-out criteria is to check if there is a some condition in the layer chain that is independent of the rest of the biomes. For instance in the case of finding a swamp, we can notice that there is a pseudo-random number check in layer 19: Biome, that converts Lush temperature climates to swamplands. However, the pseudo-random number generator is seeded by a combination of the position and the world seed, so we can make sure the random number output gives the required value without going through the rest of the layers. The more expensive generator can afterwards be used to make sure that a Lush climate is actually present at that position.

In the summary below in sections 1.1 – 1.44 I have laid out some of the properties of each layer, such as the scale of the layer and the possible values for the map entries with their respective average probability of occurrence (Note: these are estimates and may vary). When constructing a seed finder these values can be used as a reference to determine reasonable cut-off points for the generator.


Layer Scale
1. Island
1:4096
2. Zoom
3. Add Island
1:2048
4. Zoom
5. Add Island
1:1024
6. Add Island
7. Add Island
8. Remove Too Much Ocean
9. Add Snow
10. Add Island
11. Edge: Cool/Warm
12. Edge: Heat/Ice
13. Edge: Special
14. Zoom
15. Zoom
16. Add Island
1:256
17. Add Mushroom Island
18. Deep Ocean
19. Biome
23. River Init
20. Zoom
24. Zoom
35. Zoom
21. Zoom
25. Zoom
36. Zoom
22. Biome Edge
1:64
26. Hills
27. Rare Biome
28. Zoom
37. Zoom
29. Add Island
1:32
30. Zoom
38. Zoom
31. Shore
1:16
32. Zoom
39. Zoom
33. Zoom
40. Zoom
34. Smooth
41. River
1:4
42. Smooth
43. River Mix
44. Voronoi Zoom

1.1 Layer 1: Island

Scale:	1:4096	
Value	Type	Occurrence
0	Ocean	90.0%
1	Land	10.0%

1.2 Layer 2: Zoom

Scale:	1:2048	
Value	Type	Occurrence
0	Ocean	90.0%
1	Land	10.0%

1.3 Layer 3: Add Island

Scale:	1:2048	
Value	Type	Occurrence
0	Ocean	84.3%
1	Land	15.7%

1.4 Layer 4: Zoom

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	84.9%
1	Land	15.1%

1.5 Layer 5: Add Island

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	81.4%
1	Land	18.6%

1.6 Layer 6: Add Island

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	77.5%
1	Land	22.5%

1.7 Layer 7: Add Island

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	73.4%
1	Land	26.6%

1.8 Layer 8: Remove Too Much Ocean

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	49.4%
1	Land	50.6%

1.9 Layer 9: Add Snow

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	49.4%
1	Warm	33.7%
3	Cold	4.8%
4	Freezing	12.4%

Changes some of the land starting points to Cold and Freezing.

1.10 Layer 10: Add Island

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	33.8%
1	Warm	37.6%
3	Cold	4.8%
4	Freeing	23.9%

Spreads out the continental areas, decreasing the amount of ocean.

1.11 Layer 11: Edge, Cool/Warm

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	33.8%
1	Warm	13.6%
2	Lush	23.9%
3	Cold	4.8%
4	Freezing	23.9%

Changes Warm(1) lands which are adjacent to Cold(3) or Freezing(4) temperatures to Lush(2).

1.12 Layer 12: Edge, Heat/Ice

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	33.8%
1	Warm	13.6%
2	Lush	23.9%
3	Cold	23.9%
4	Freezing	4.8%

Changes Freezing(4) lands which are adjacent to Warm(1) or Lush(2) temperatures to Cold(3).

1.13 Layer 13: Edge, Special

Scale:	1:1024	
Value	Type	Occurrence
0	Ocean	33.8%
1	Warm	12.5%
2	Lush	22.1%
3	Cold	22.1%
4	Freezing	4.4%
-	Special	5.1% / 60

Marks every 1 in 13 lands (non-ocean) as special, by adding a 4-bit number in 0x0F00 to the value.

1.14 Layer 14: Zoom

Scale:	1:512	
Value	Type	Occurrence
0	Ocean	35.6%
1	Warm	12.2%
2	Lush	21.9%
3	Cold	21.9%
4	Freezing	4.2%
-	Special	4.2% / 60

1.15 Layer 15: Zoom

Scale:	1:256	
Value	Type	Occurrence
0	Ocean	35.6%
1	Warm	11.9%
2	Lush	21.9%
3	Cold	21.9%
4	Freezing	4.2%
-	Special	4.5% / 60

1.16 Layer 16: Add Island

Scale:	1:256	
Value	Type	Occurrence
0	Ocean	31.4%
1	Warm	12.7%
2	Lush	22.4%
3	Cold	22.8%
4	Freezing	6.2%
-	Special	4.5% / 60

1.17 Layer 17: Add Mushroom Island

Scale:	1:256		
Value	Type	Occurrence	
0	Ocean	31.4%	
1	Warm	12.8%	
2	Lush	22.5%	
3	Cold	22.7%	
4	Freezing	6.08%	
14	Mushroom	0.0773%	
$(n << 8) + 1$ with $n = 1, 4, 7, 10, 13$	-	0.0690% each	0.90%
$(n << 8) + 1$ with $n = 2, 3, 5, 6, 8, 9, 11, 12, 14, 15$	-	0.0553% each	
$(n << 8) + 2$ with $n = 1, 4, 7, 10, 13$	-	0.1236% each	1.56%
$(n << 8) + 2$ with $n = 2, 3, 5, 6, 8, 9, 11, 12, 14, 15$	-	0.0961% each	
$(n << 8) + 3$ with $n = 1, 4, 7, 10, 13$	-	0.1078% each	1.58%
$(n << 8) + 3$ with $n = 2, 3, 5, 6, 8, 9, 11, 12, 14, 15$	-	0.1037% each	
$(n << 8) + 4$ with $n = 1, 4, 7, 10, 13$	-	0.0212% each	0.32%
$(n << 8) + 4$ with $n = 2, 3, 5, 6, 8, 9, 11, 12, 14, 15$	-	0.0212% each	

Changes every 100th Ocean (adjacent to more Ocean) to Mushroom Island. The special land types are written out in full in the table above. (Note "<<" represents a left bit shit.) Added together, the special types make up an average of about 4.37% of the area.

1.18 Layer 18: Deep Ocean

Scale:	1:256	
Value	Type	Occurrence
0	Ocean	22.0%
1	Warm	12.8%
2	Lush	22.5%
3	Cold	22.7%
4	Freezing	6.1%
14	Mushroom	0.0773%
24	Deep Ocean	9.4%
-	Special	4.4% / 60

Changes any Ocean which is surrounded by more Ocean to Deep Ocean. (Special lands still have the same statistics as shown for Layer 17.)

1.19 Layer 19: Biome

Scale:	1:256	
Value	Type	Occurrence
0	ocean	22.0%
1	plains	11.6%
2	desert	6.41%
3	extremeHills	9.44%
4	forest	9.43%
5	taiga	5.68%
6	swampland	3.75%
12	icePlains	4.80%
14	mushroomIsland	0.0773%
21	jungle	1.58%
24	deepOcean	9.38%
27	birchForest	3.75%
29	roofedForest	3.75%
30	coldTaiga	1.60%
32	megaTaiga	1.58%
35	savanna	4.28%
38	mesaPlateau_F	0.598%
39	mesaPlateau	0.299%

Assigns the actual biome IDs to the lands, based on the temperature category of the land. To be more specific the selection criteria are:

Temperature		Weight	Biome
Warm	$\longrightarrow$	1/2	desert
		1/3	savanna
		1/6	plains
Warm, special	$\longrightarrow$	1/3	mesaPlateau
		2/3	mesaPlateau_F
Lush	$\longrightarrow$	1/6	forest
		1/6	roofedForest
		1/6	extremeHills
		1/6	plains
		1/6	birchForest
		1/6	swampland
Lush, special	$\longrightarrow$	1/1	jungle
Cold	$\longrightarrow$	1/4	forest
		1/4	extremeHills
		1/4	taiga
		1/4	plains
Cold, special	$\longrightarrow$	1/1	megaTaiga
Freezing	$\longrightarrow$	3/4	icePlains
		1/4	coldTaiga

Ocean and Mushroom types are not affected by this layer. The special category is selected when one of the higher bits (0xF00) are set. E.g. 0x603 has high bits and is thus a special Cold(3) category.

1.20 Layer 20: Zoom

Scale:	1:128	
Value	Type	Occurrence
0	ocean	23.6%
1	plains	11.3%
2	desert	6.48%
3	extremeHills	9.28%
4	forest	9.28%
5	taiga	5.52%
6	swampland	3.61%
12	icePlains	4.94%
14	mushroomIsland	0.0586%
21	jungle	1.62%
24	deepOcean	9.09%
27	birchForest	3.61%
29	roofedForest	3.61%
30	coldTaiga	1.45%
32	megaTaiga	1.62%
35	savanna	4.12%
38	mesaPlateau_F	0.602%
39	mesaPlateau	0.279%

1.21 Layer 21: Zoom

Scale:	1:64	
Value	Type	Occurrence
0	ocean	23.9%
1	plains	11.2%
2	desert	6.50%
3	extremeHills	9.23%
4	forest	9.23%
5	taiga	5.49%
6	swampland	3.56%
12	icePlains	5.00%
14	mushroomIsland	0.0543%
21	jungle	1.62%
24	deepOcean	9.03%
27	birchForest	3.58%
29	roofedForest	3.57%
30	coldTaiga	1.43%
32	megaTaiga	1.62%
35	savanna	4.08%
38	mesaPlateau_F	0.603%
39	mesaPlateau	0.275%

1.22 Layer 22: Biome Edge

Scale:	1:64	
Value	Type	Occurrence
0	ocean	23.9%
1	plains	11.2%
2	desert	6.48%
3	extremeHills	9.23%
4	forest	9.23%
5	taiga	6.01%
6	swampland	3.47%
12	icePlains	5.00%
14	mushroomIsland	0.0543%
21	jungle	1.62%
23	jungleEdge	0.0144%
24	deepOcean	9.03%
27	birchForest	3.58%
29	roofedForest	3.57%
30	coldTaiga	1.43%
32	megaTaiga	1.11%
34	extremeHillsPlus	0.0111%
35	savanna	4.09%
37	mesa	0.321%
38	mesaPlateau_F	0.385%
39	mesaPlateau	0.172%

Introduces the biomes jungleEdge, extremeHillsPlus and mesa. The conditional biome changes that take place in this layer are:

mesaPlateau_F $\longrightarrow$ mesa
mesaPlateau $\longrightarrow$ mesa
megaTaiga $\longrightarrow$ taiga
desert $\longrightarrow$ extremeHillsPlus
swampland $\longrightarrow$ jungleEdge
swampland $\longrightarrow$ plains

1.23 Layer 23: River Init

Starts a new branch of off Layer 18: Deep Ocean. This layer overwrites each map entry that is not Ocean(0) with a pseudo random number between 2 and 300000 (inclusive).

1.24 Layer 24: Zoom

1.25 Layer 25: Zoom

1.26 Layer 26: Hills

This is a multilayer which joins the biome generation with the river generator branch at the layers Biome Edge (22) and Zoom (25). However at this stage the river branch is mostly just used as a pseudo random number source.

Scale:	1:64	
Value	Type	Occurrence
0	ocean	17.5%
1	plains	9.86%
2	desert	4.83%
3	extremeHills	6.95%
4	forest	8.87%
5	taiga	4.67%
6	swampland	3.36%
12	icePlains	3.54%
13	iceMountains	1.30%
14	mushroomIsland	0.0543%
17	desertHills	1.46%
18	forestHills	2.68%
19	taigaHills	1.15%
21	jungle	1.15%
22	jungleHills	0.420%
23	jungleEdge	0.0140%
24	deepOcean	14.4%
27	birchForest	2.58%
28	birchForestHills	0.800%
29	roofedForest	2.57%
30	coldTaiga	1.11%
31	coldTaigaHills	0.282%
32	megaTaiga	0.688%
33	megaTaigaHills	0.344%
34	extremeHillsPlus	1.80%
35	savanna	3.05%
36	savannaPlateau	0.830%
37	mesa	0.486%
38	mesaPlateau_F	0.240%
39	mesaPlateau	0.107%

129	Sunflower Plains	0.4816%
130	Desert M	0.1971%
131	Extreme Hills M	0.2944%
132	Flower Forest	0.4904%
133	Taiga M	0.1897%
134	Swampland M	0.1109%
140	Ice Plains Spikes	0.1606%
149	Jungle M	0.0511%
151	Jungle Edge M	0.0005%
155	Birch Forest M	0.1154%
156	Birch Forest Hills M	0.0854%
157	Roofed Forest M	0.1144%
158	Cold Taiga M	0.0461%
160	Mega Spruce Taiga	0.0365%
161	Redwood Taiga Hills	0.0366%
162	Extreme Hills+ M	0.1913%
163	Savanna M	0.1240%
164	Savanna Plateau M	0.0853%
165	Mesa (Bryce)	0.0263%
166	Mesa Plateau F M	0.0123%
167	Mesa Plateau M	0.0056%

Nine new biomes: iceMountains, desertHills, forestHills, taigaHills, jungleHills, birchForestHills, coldTaigaHills, megaTaigaHills and savannaPlateau. Also there are 21 new mutated variants which I have listed by their ingame display name.

This layer converts some map entries to related biomes, forming small biome patches. A list of the conversions that take place in this manor is shown below. Additionally, this layer adds 128 to some map entries, provided that the resulting biome ID is valid, forming mutated biome variants.

desert	$\longrightarrow$	desertHill
forest	$\longrightarrow$	forestHills
birchForest	$\longrightarrow$	birchForestHills
roofedForest	$\longrightarrow$	plains
taiga	$\longrightarrow$	taigaHills
megaTaiga	$\longrightarrow$	megaTaigaHills
coldTaiga	$\longrightarrow$	coldTaigaHills
plains	$\longrightarrow$	(1/3) forestHills, (2/3) forest
icePlains	$\longrightarrow$	iceMountains
jungle	$\longrightarrow$	jungleHills
ocean	$\longrightarrow$	deepOcean
extremeHills	$\longrightarrow$	extremeHillsPlus
savanna	$\longrightarrow$	savannaPlateau
mesaPlateau_F	$\longrightarrow$	mesa
deepOcean	$\longrightarrow$	(1/2) plains, (1/2) forest

1.27 Layer 27: Rare Biome

Scale:	1:64	
Value	Type	Occurrence
1	plains	9.68%
129	Sunflower Plains	0.654%
...	...	...

This layer converts 1/57 th of Plains to Sunflower Plains. It has no affect on other biomes.

1.28 Layer 31: Shore

Scale:	1:16	
Value	Type	Occurrence
0	ocean	15.7%
1	plains	8.93%
2	desert	4.59%
3	extremeHills	6.68%
4	forest	8.67%
5	taiga	4.39%
6	swampland	3.44%
12	icePlains	3.44%
13	iceMountains	1.15%
14	mushroomIsland	0.0370%
15	mushroomIslandShore	0.0208%
16	beach	3.81%
17	desertHills	1.27%
18	forestHills	2.27%
19	taigaHills	0.975%
21	jungle	1.03%
22	jungleHills	0.359%
23	jungleEdge	0.0853%
24	deepOcean	15.7%
25	stoneBeach	0.534%
26	coldBeach	0.311%
27	birchForest	2.45%
28	birchForestHills	0.800%
29	roofedForest	2.57%
30	coldTaiga	1.07%
31	coldTaigaHills	0.246%
32	megaTaiga	0.691%
33	megaTaigaHills	0.313%
34	extremeHillsPlus	2.84%
35	savanna	3.05%
36	savannaPlateau	0.715%
37	mesa	0.469%
38	mesaPlateau_F	0.242%
39	mesaPlateau	0.103%

129	Sunflower Plains	0.571%
130	Desert M	0.188%
131	Extreme Hills M	0.284%
132	Flower Forest	0.430%
133	Taiga M	0.176%
134	Swampland M	0.111%
140	Ice Plains Spikes	0.157%
149	Jungle M	0.0492%
151	Jungle Edge M	0.000451%
155	Birch Forest M	0.109%
156	Birch Forest Hills M	0.0827%
157	Roofed Forest M	0.114%
158	Cold Taiga M	0.0477%
160	Mega Spruce Taiga	0.0358%
161	Redwood Taiga Hills	0.0354%
162	Extreme Hills+ M	0.184%
163	Savanna M	0.119%
164	Savanna Plateau M	0.0824%
165	Mesa (Bryce)	0.0236%
166	Mesa Plateau F M	0.0121%
167	Mesa Plateau M	0.00566%

New biomes: mushroomIslandShore, beach, stoneBeach, coldBeach.

1.29 Layer 41: River

Scale:	1:4	
Value	Type	Occurrence
-1	none	94.3%
7	river	5.70%

Uses the zoomed pseudo random output of the river branch to determine the position of rivers in the world. All other values are set to -1.

1.30 Layer 43: River Mix

Scale:	1:4

Value	Type	Occurrence
0	ocean	13.9%
1	plains	9.69%
2	desert	4.80%
3	extremeHills	7.24%
4	forest	9.21%
5	taiga	4.47%
6	swampland	4.03%
7	river	4.19%
11	frozenRiver	0.0872%
12	icePlains	1.52%
13	iceMountains	0.495%
14	mushroomIsland	0.0257%
15	mushroomIslandShore	0.0172%
16	beach	2.96%
17	desertHills	1.33%
18	forestHills	2.50%
19	taigaHills	0.994%
21	jungle	1.21%
22	jungleHills	0.421%
23	jungleEdge	0.101%
24	deepOcean	12.7%
25	stoneBeach	0.426%
26	coldBeach	0.132%
27	birchForest	2.96%
28	birchForestHills	0.849%
29	roofedForest	2.93%
30	coldTaiga	0.466%
31	coldTaigaHills	0.107%
32	megaTaiga	0.704%
33	megaTaigaHills	0.316%
34	extremeHillsPlus	1.69%
35	savanna	2.97%
36	savannaPlateau	0.750%
37	mesa	0.456%
38	mesaPlateau_F	0.251%
39	mesaPlateau	0.110%

129	Sunflower Plains	0.616%
130	Desert M	0.205%
131	Extreme Hills M	0.315%
132	Flower Forest	0.477%
133	Taiga M	0.184%
134	Swampland M	0.130%
140	Ice Plains Spikes	0.0681%
149	Jungle M	0.0582%
151	Jungle Edge M	0.000625%
155	Birch Forest M	0.136%
156	Birch Forest Hills M	0.101%
157	Roofed Forest M	0.136%
158	Cold Taiga M	0.0196%
160	Mega Spruce Taiga	0.0371%
161	Redwood Taiga Hills	0.0369%
162	Extreme Hills+ M	0.203%
163	Savanna M	0.128%
164	Savanna Plateau M	0.0882%
165	Mesa (Bryce)	0.0257%
166	Mesa Plateau F M	0.0134%
167	Mesa Plateau M	0.00585%

This layer is actually used in parts of the Minecraft code where a faster alternative for the full biome generator is required. Note that this layer has a scale of 1:4 and the final map is just a zoomed version of this layer's output. The function of this layer is to apply the rivers to the main biome branch. A new biome is also added in this layer: frozenRiver.

1.31 Layer 44: Voronoi Zoom

Scale:	1:1	
Value	Type	Occurrence
0	ocean	13.7%
1	plains	10.0%
2	desert	4.84%
3	extremeHills	7.50%
4	forest	9.54%
5	taiga	4.59%
6	swampland	4.22%
7	river	4.30%
11	frozenRiver	0.0806%
12	icePlains	1.40%
13	iceMountains	0.451%
14	mushroomIsland	0.0209%
15	mushroomIslandShore	0.0137%
16	beach	2.92%
17	desertHills	1.33%
18	forestHills	2.59%
19	taigaHills	1.00%
21	jungle	1.26%
22	jungleHills	0.429%
23	jungleEdge	0.118%
24	deepOcean	11.2%
25	stoneBeach	0.433%
26	coldBeach	0.118%
27	birchForest	3.12%
28	birchForestHills	0.890%
29	roofedForest	3.09%
30	coldTaiga	0.428%
31	coldTaigaHills	0.0984%
32	megaTaiga	0.675%
33	megaTaigaHills	0.303%
34	extremeHillsPlus	1.74%
35	savanna	3.00%
36	savannaPlateau	0.751%
37	mesa	0.464%
38	mesaPlateau_F	0.238%
39	mesaPlateau	0.105%

129	Sunflower Plains	0.635%
130	Desert M	0.203%
131	Extreme Hills M	0.325%
132	Flower Forest	0.491%
133	Taiga M	0.190%
134	Swampland M	0.134%
140	Ice Plains Spikes	0.0625%
149	Jungle M	0.0612%
151	Jungle Edge M	0.000781%
155	Birch Forest M	0.144%
156	Birch Forest Hills M	0.106%
157	Roofed Forest M	0.142%
158	Cold Taiga M	0.0181%
160	Mega Spruce Taiga	0.0356%
161	Redwood Taiga Hills	0.0354%
162	Extreme Hills+ M	0.210%
163	Savanna M	0.129%
164	Savanna Plateau M	0.0885%
165	Mesa (Bryce)	0.0258%
166	Mesa Plateau F M	0.0131%
167	Mesa Plateau M	0.00559%

This is the final layer in the biome generator and contains all the Overworld biomes except for frozenOcean, which does not generate in Mincraft 1.7 - 1.12.