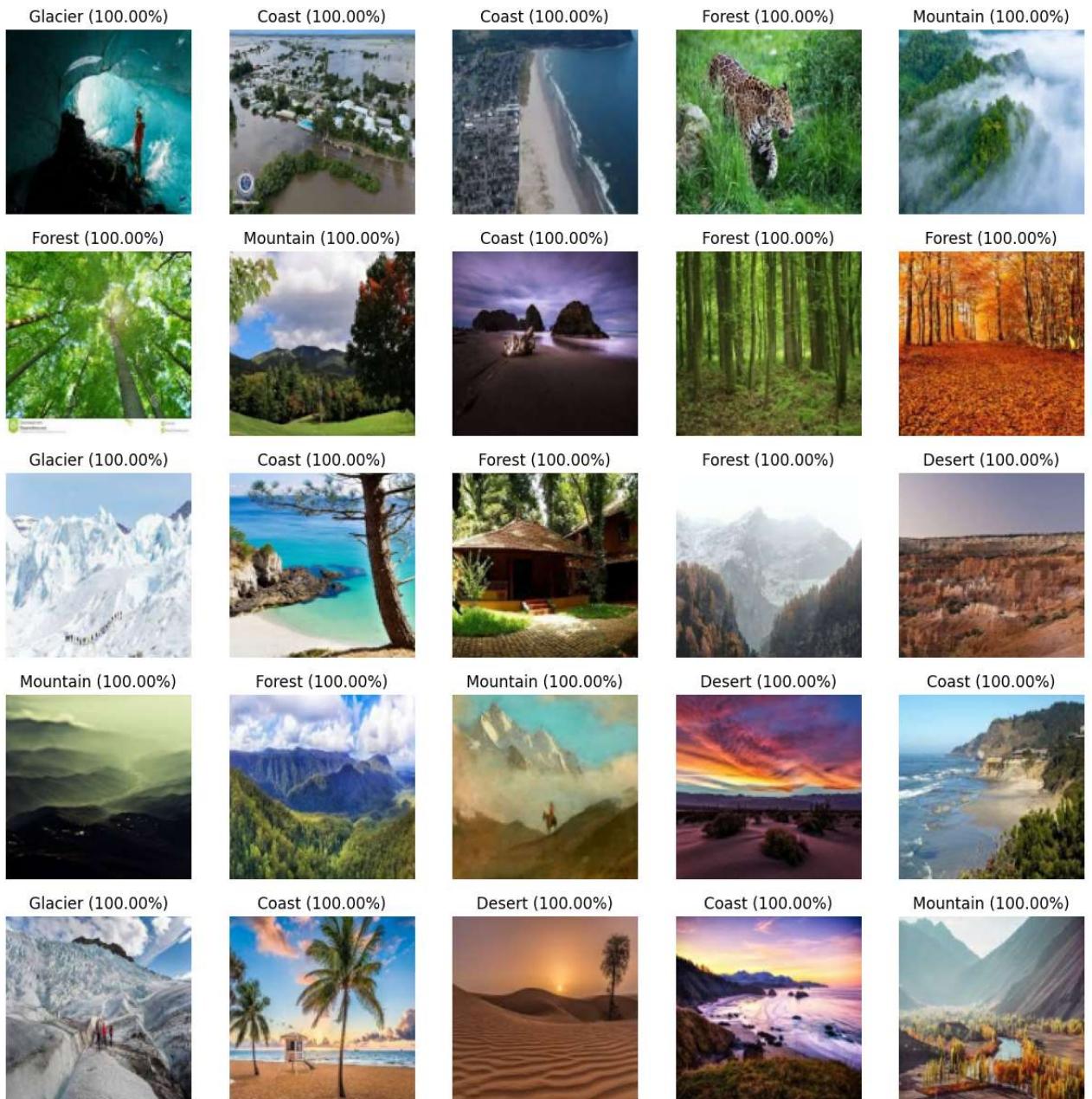


## Visualize Dataset



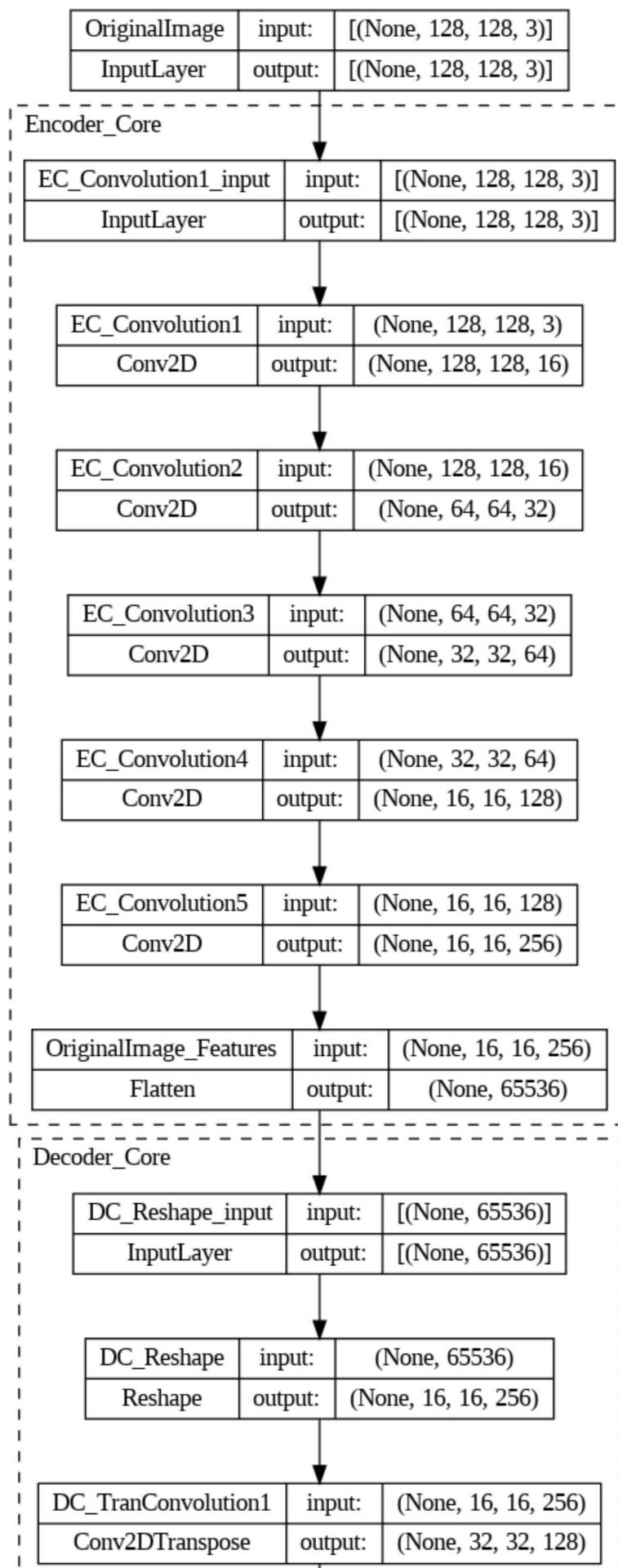
## Undercomplete AutoEncoder

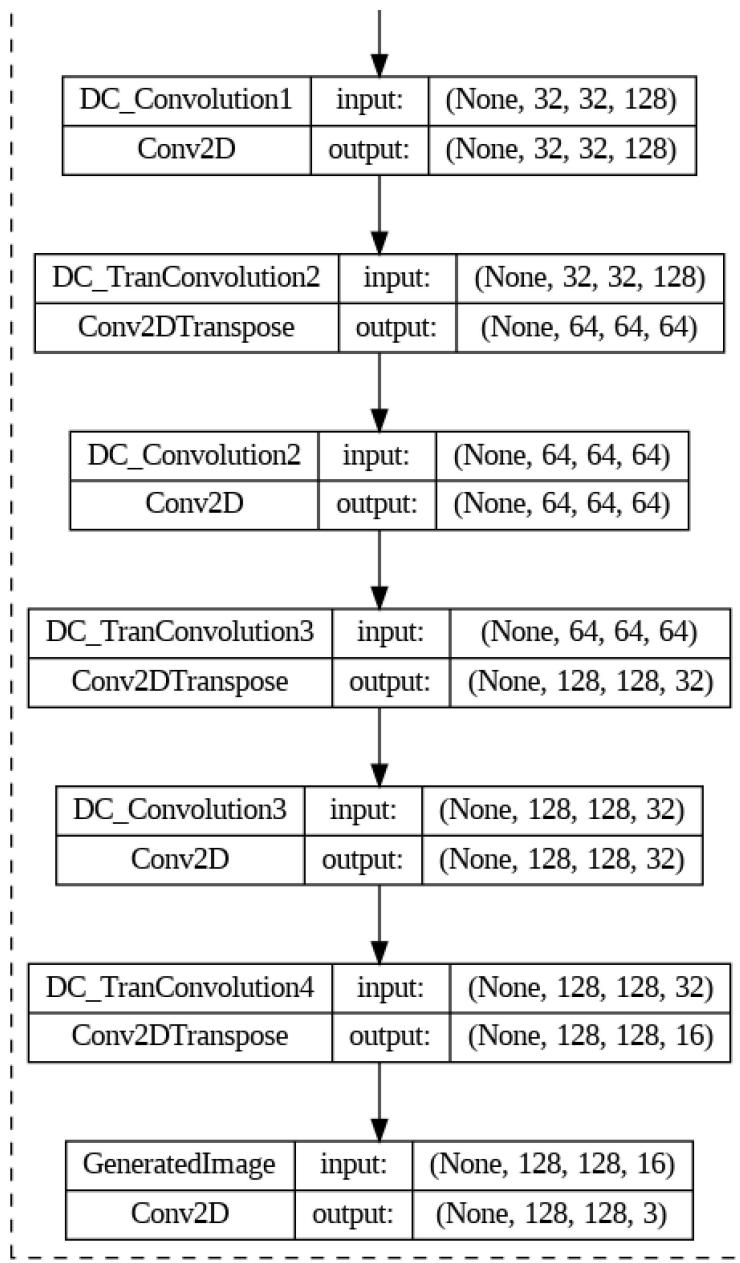
Model: "AE"

Layer (type)	Output Shape	Param #
<hr/>		
OriginalImage (InputLayer)	[(None, 128, 128, 3)]	0
Encoder_Core (Sequential)	(None, 65536)	392608
Decoder_Core (Sequential)	(None, 128, 128, 3)	260755
<hr/>		
Total params: 653363 (2.49 MB)		
Trainable params: 653363 (2.49 MB)		
Non-trainable params: 0 (0.00 Byte)		

---

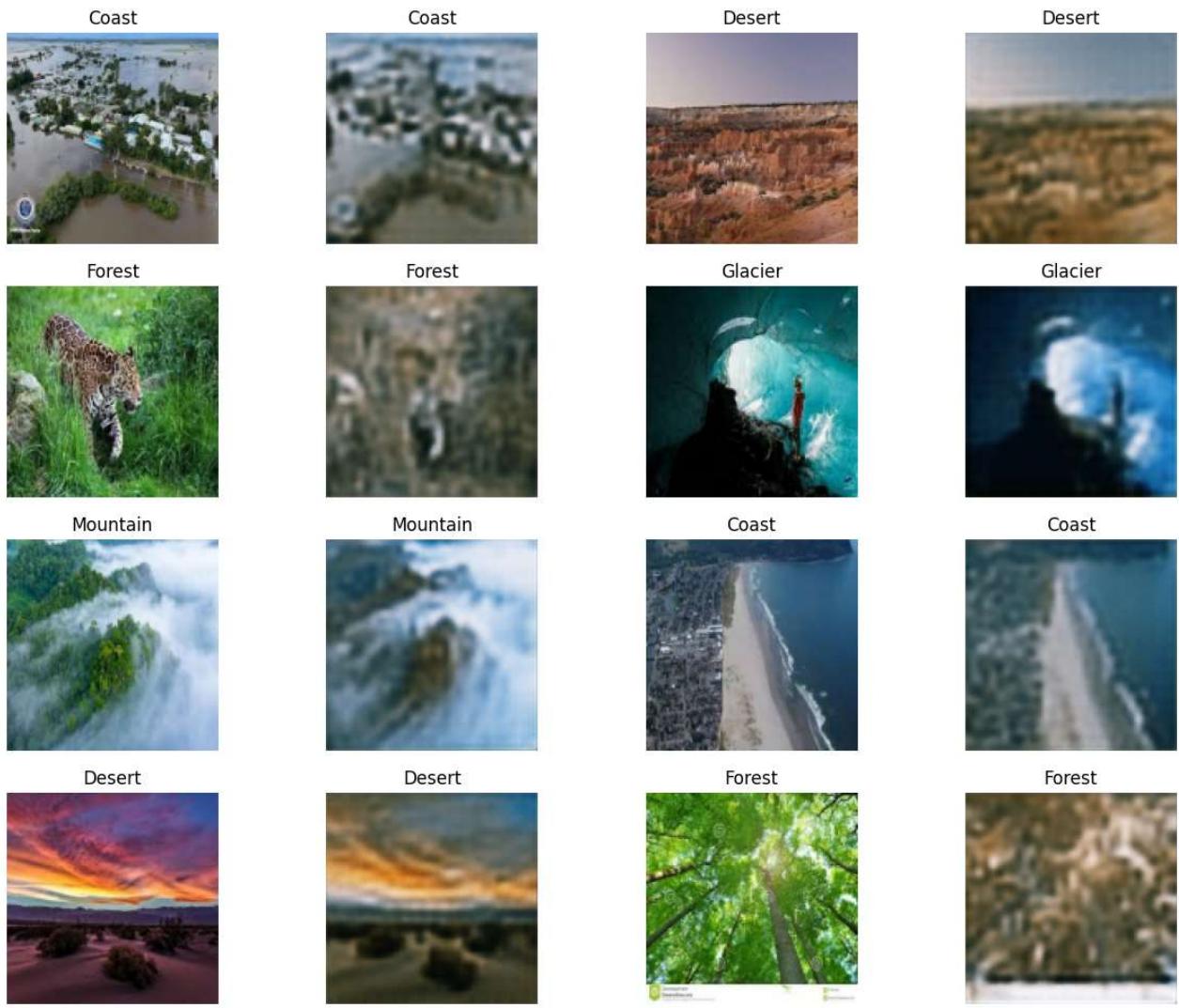
Out[130...]





## Training

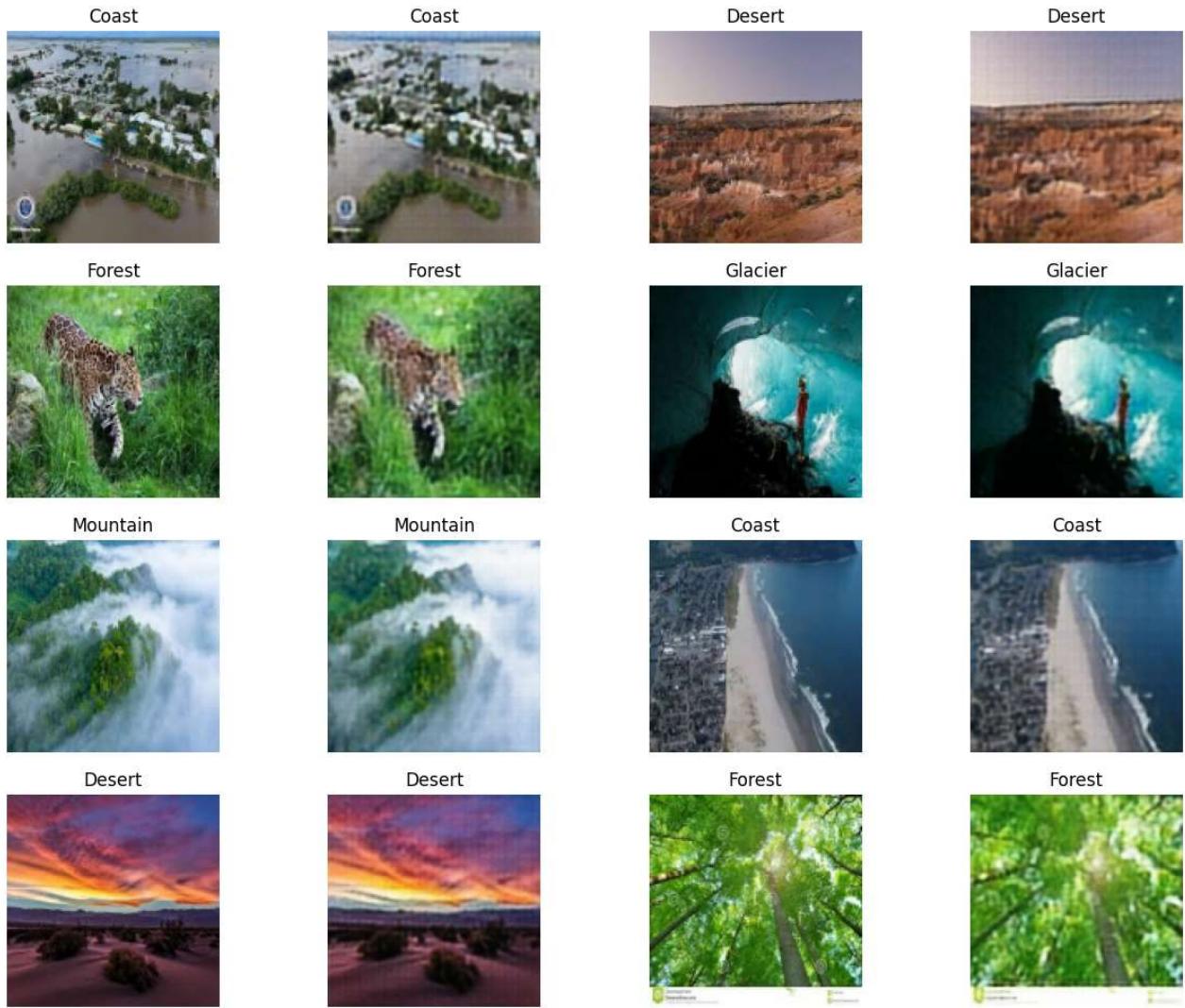
Epoch 1/1000  
 599/Unknown - 20s 27ms/step - loss: 0.0171  
 [2023-12-08 01:54:41.892625]: Reconstructing images for epoch 1 ...



```

600/600 [=====] - 34s 49ms/step - loss: 0.0171 - val_loss: 0.0060
Epoch 2/1000
600/600 [=====] - 16s 25ms/step - loss: 0.0051 - val_loss: 0.0053
Epoch 3/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0040 - val_loss: 0.0036
Epoch 4/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0036 - val_loss: 0.0027
Epoch 5/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0026 - val_loss: 0.0023
Epoch 6/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0024 - val_loss: 0.0022
Epoch 7/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0022 - val_loss: 0.0021
Epoch 8/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0021 - val_loss: 0.0019
Epoch 9/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0020 - val_loss: 0.0019
Epoch 10/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0020 - val_loss: 0.0019
Epoch 11/1000
599/600 [=====>.] - ETA: 0s - loss: 0.0018
[2023-12-08 01:57:05.907648]: Reconstructing images for epoch 11 ...

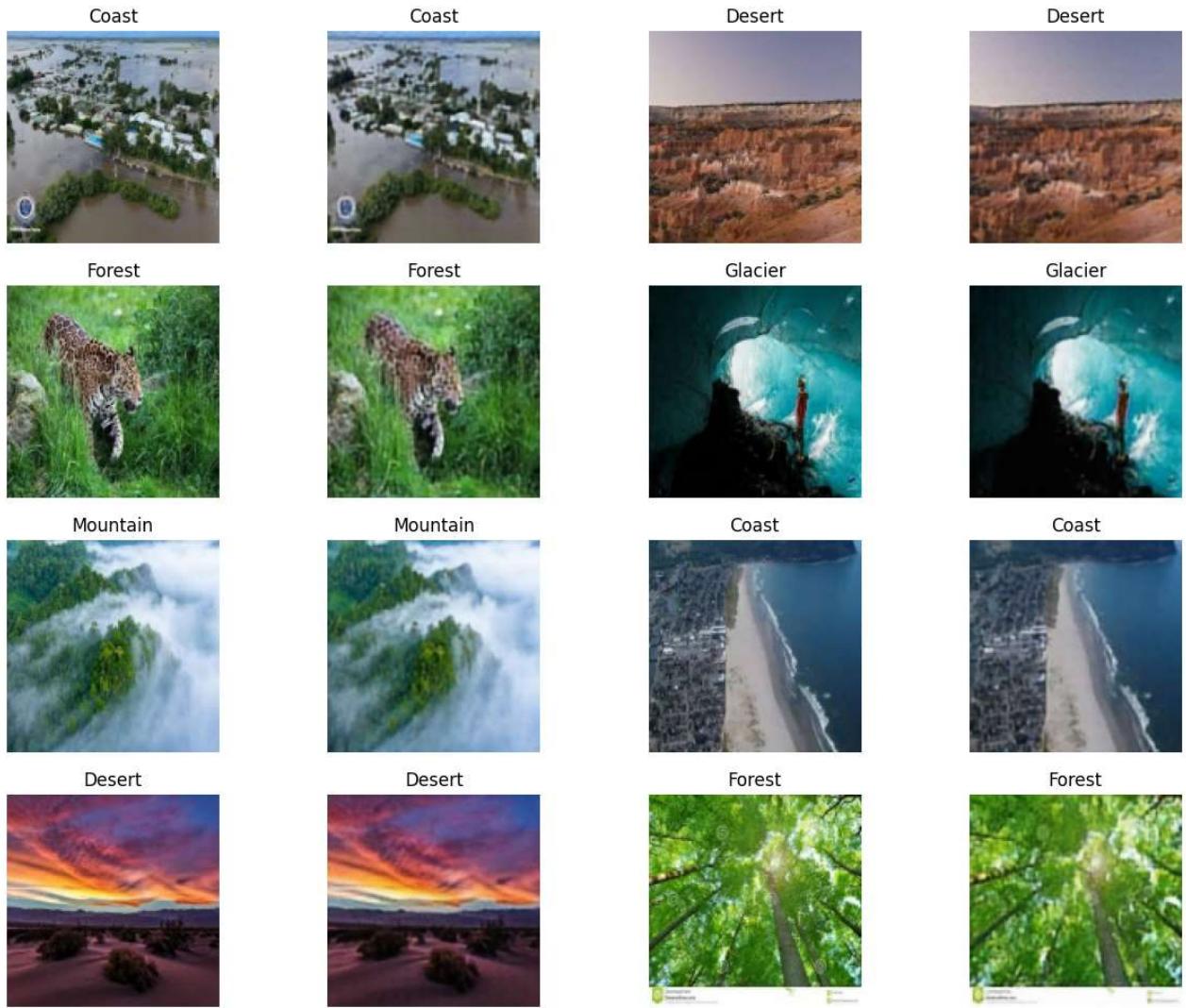
```



```

600/600 [=====] - 15s 25ms/step - loss: 0.0018 - val_loss: 0.0027
Epoch 12/1000
600/600 [=====] - 14s 24ms/step - loss: 0.0017 - val_loss: 0.0015
Epoch 13/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0017 - val_loss: 0.0019
Epoch 14/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0015 - val_loss: 0.0015
Epoch 15/1000
600/600 [=====] - 14s 24ms/step - loss: 0.0015 - val_loss: 0.0017
Epoch 16/1000
600/600 [=====] - 15s 24ms/step - loss: 0.0014 - val_loss: 0.0013
Epoch 17/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0014 - val_loss: 0.0012
Epoch 18/1000
600/600 [=====] - 14s 24ms/step - loss: 0.0013 - val_loss: 0.0012
Epoch 19/1000
600/600 [=====] - 14s 24ms/step - loss: 0.0012 - val_loss: 0.0012
Epoch 20/1000
600/600 [=====] - 15s 24ms/step - loss: 0.0012 - val_loss: 0.0012
Epoch 21/1000
600/600 [=====] - ETA: 0s - loss: 0.0011
[2023-12-08 01:59:31.114771]: Reconstructing images for epoch 21 ...

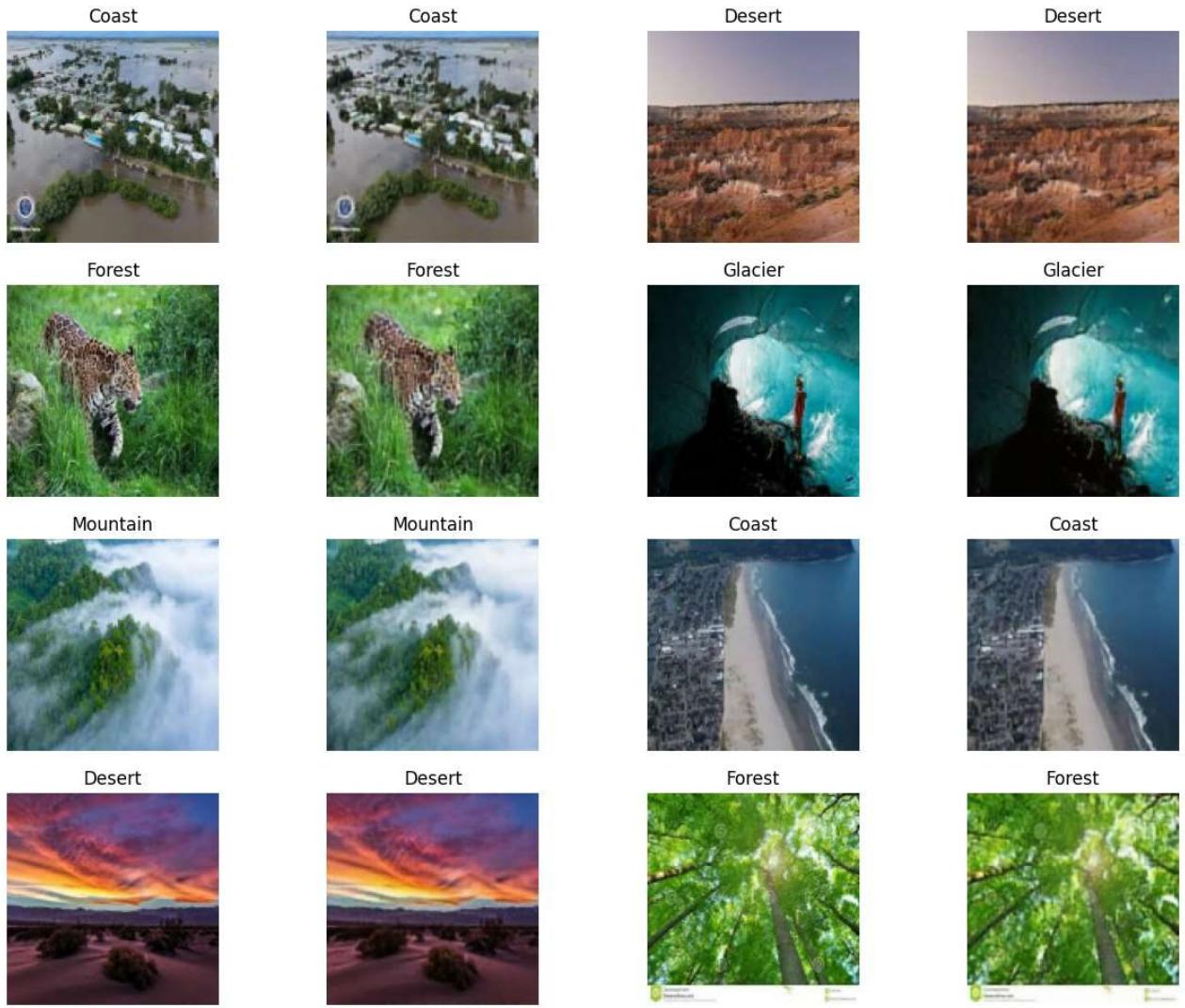
```



```

600/600 [=====] - 16s 27ms/step - loss: 0.0011 - val_loss: 0.0010
Epoch 22/1000
600/600 [=====] - 15s 24ms/step - loss: 0.0011 - val_loss: 0.0011
Epoch 23/1000
600/600 [=====] - 14s 24ms/step - loss: 0.0011 - val_loss: 0.0010
Epoch 24/1000
600/600 [=====] - 14s 23ms/step - loss: 0.0010 - val_loss: 9.6901e-04
Epoch 25/1000
600/600 [=====] - 14s 24ms/step - loss: 9.9515e-04 - val_loss: 9.1328e-04
Epoch 26/1000
600/600 [=====] - 14s 24ms/step - loss: 9.7637e-04 - val_loss: 0.0012
Epoch 27/1000
600/600 [=====] - 14s 24ms/step - loss: 8.9795e-04 - val_loss: 8.4023e-04
Epoch 28/1000
600/600 [=====] - 14s 23ms/step - loss: 9.1371e-04 - val_loss: 7.8667e-04
Epoch 29/1000
600/600 [=====] - 14s 24ms/step - loss: 8.2831e-04 - val_loss: 9.6610e-04
Epoch 30/1000
600/600 [=====] - 15s 24ms/step - loss: 8.5251e-04 - val_loss: 7.5410e-04
Epoch 31/1000
598/600 [=====>..] - ETA: 0s - loss: 8.1469e-04
[2023-12-08 02:02:02.914181]: Reconstructing images for epoch 31 ...

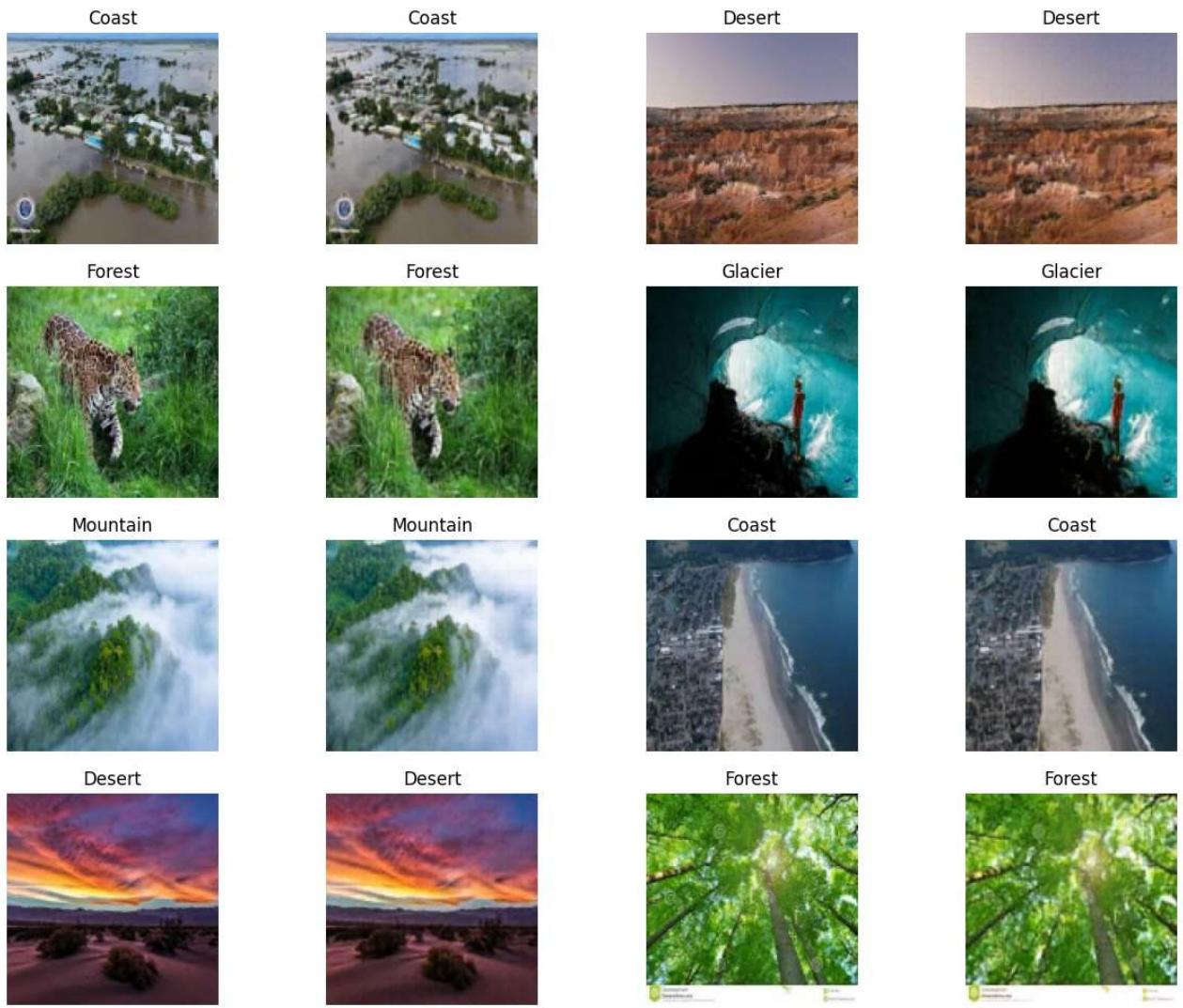
```



```

600/600 [=====] - 16s 27ms/step - loss: 8.1491e-04 - val_loss: 8.2319e-04
Epoch 32/1000
600/600 [=====] - 14s 23ms/step - loss: 7.8325e-04 - val_loss: 8.1112e-04
Epoch 33/1000
600/600 [=====] - 15s 24ms/step - loss: 7.8868e-04 - val_loss: 8.1313e-04
Epoch 34/1000
600/600 [=====] - 14s 23ms/step - loss: 8.2109e-04 - val_loss: 7.2315e-04
Epoch 35/1000
600/600 [=====] - 15s 24ms/step - loss: 7.7084e-04 - val_loss: 7.6832e-04
Epoch 36/1000
600/600 [=====] - 15s 25ms/step - loss: 7.5688e-04 - val_loss: 0.0016
Epoch 37/1000
600/600 [=====] - 14s 24ms/step - loss: 7.3412e-04 - val_loss: 7.4899e-04
Epoch 38/1000
600/600 [=====] - 15s 24ms/step - loss: 7.5217e-04 - val_loss: 7.1099e-04
Epoch 39/1000
600/600 [=====] - 14s 23ms/step - loss: 7.3034e-04 - val_loss: 6.1333e-04
Epoch 40/1000
600/600 [=====] - 14s 23ms/step - loss: 6.9816e-04 - val_loss: 6.3961e-04
Epoch 41/1000
600/600 [=====] - ETA: 0s - loss: 6.7996e-04
[2023-12-08 02:04:35.914696]: Reconstructing images for epoch 41 ...

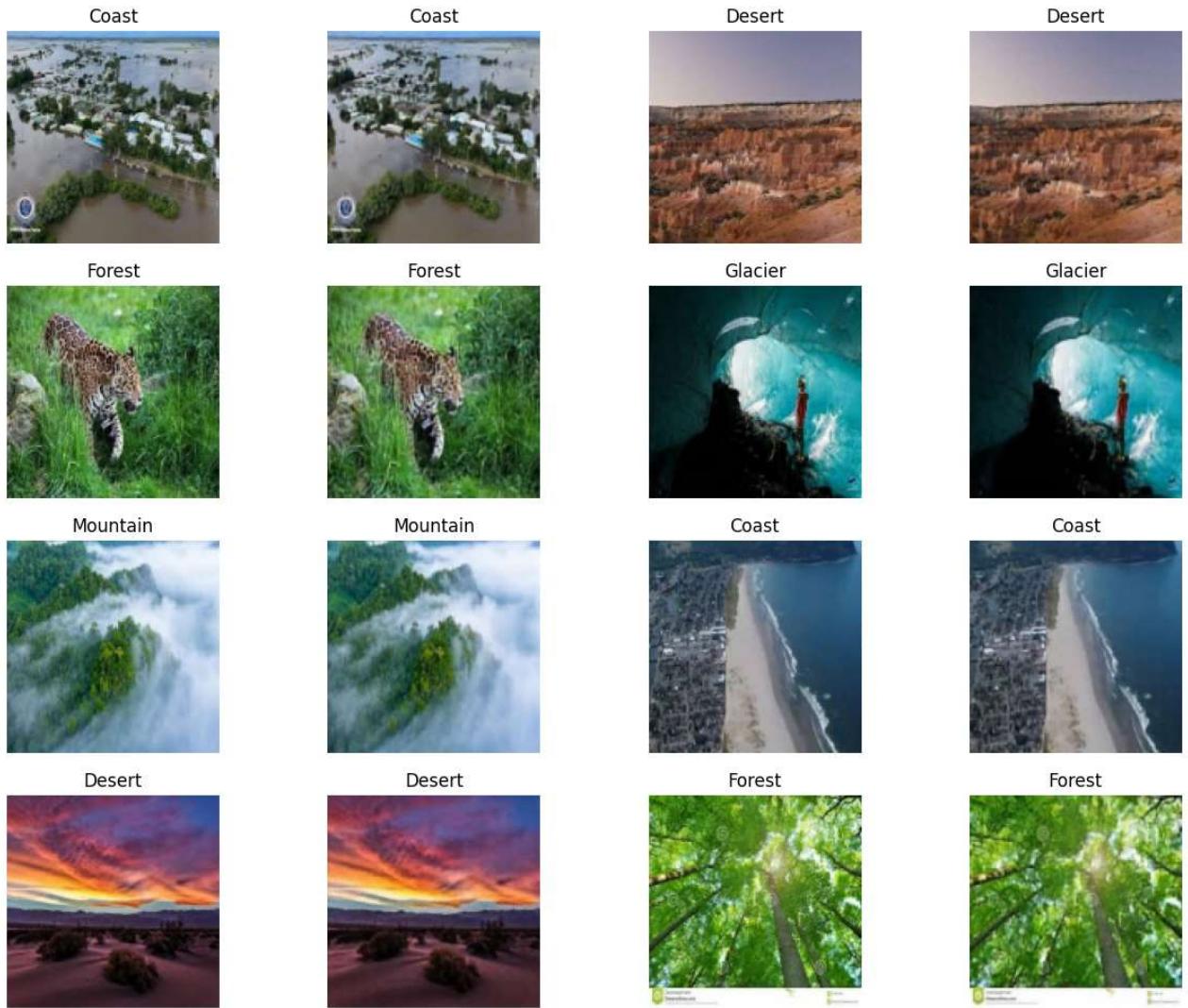
```



```

600/600 [=====] - 16s 26ms/step - loss: 6.7996e-04 - val_loss: 8.9054e-04
Epoch 42/1000
600/600 [=====] - 14s 24ms/step - loss: 6.7997e-04 - val_loss: 6.3188e-04
Epoch 43/1000
600/600 [=====] - 14s 23ms/step - loss: 6.8041e-04 - val_loss: 6.7471e-04
Epoch 44/1000
600/600 [=====] - 14s 23ms/step - loss: 6.3216e-04 - val_loss: 6.3830e-04
Epoch 45/1000
600/600 [=====] - 14s 23ms/step - loss: 6.5412e-04 - val_loss: 6.3557e-04
Epoch 46/1000
600/600 [=====] - 14s 24ms/step - loss: 6.4102e-04 - val_loss: 5.7428e-04
Epoch 47/1000
600/600 [=====] - 14s 23ms/step - loss: 6.0532e-04 - val_loss: 0.0012
Epoch 48/1000
600/600 [=====] - 14s 23ms/step - loss: 6.1803e-04 - val_loss: 5.6237e-04
Epoch 49/1000
600/600 [=====] - 14s 23ms/step - loss: 6.1468e-04 - val_loss: 6.0791e-04
Epoch 50/1000
600/600 [=====] - 14s 23ms/step - loss: 5.8027e-04 - val_loss: 5.1192e-04
Epoch 51/1000
598/600 [=====>..] - ETA: 0s - loss: 5.8016e-04
[2023-12-08 02:06:58.407365]: Reconstructing images for epoch 51 ...

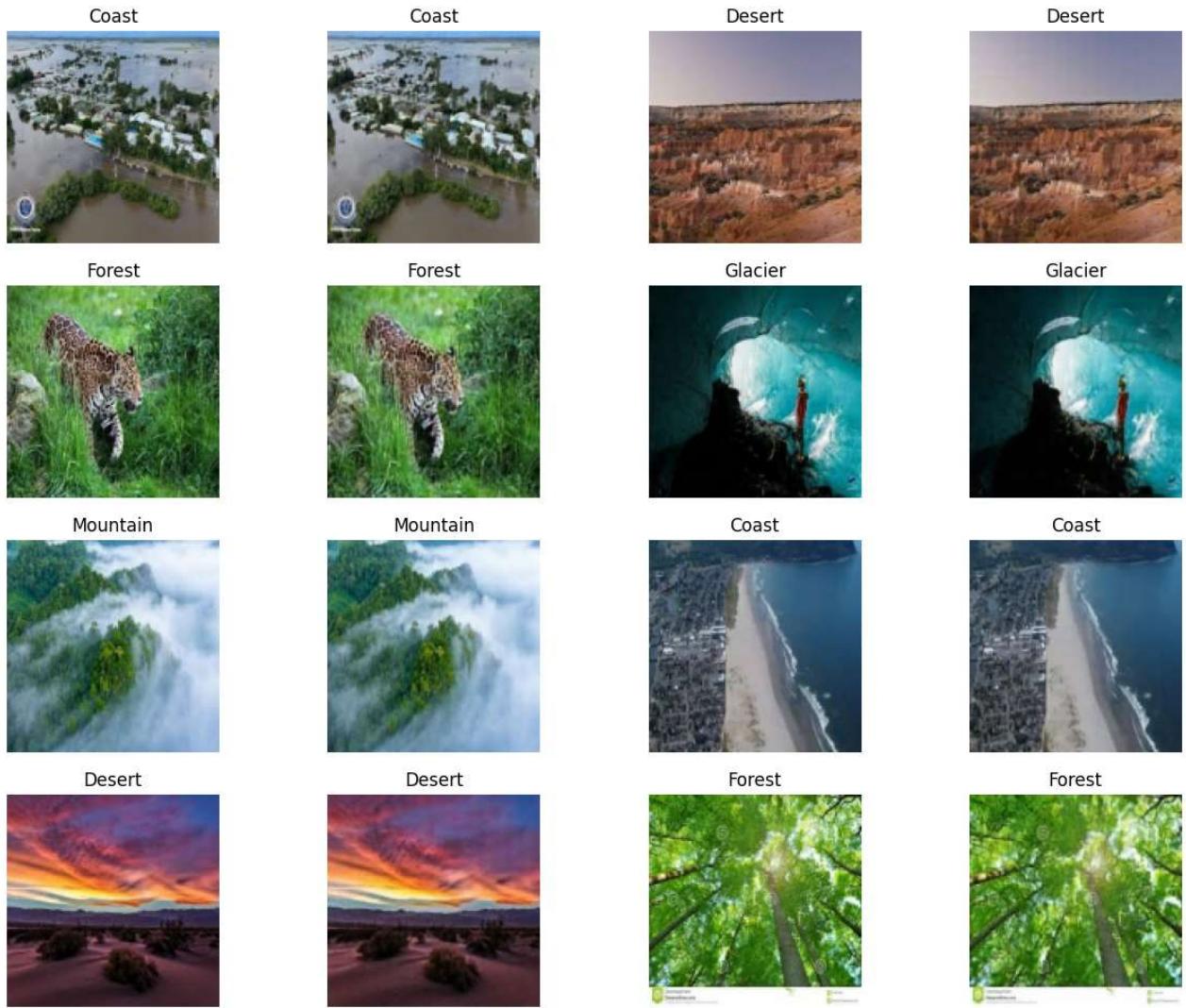
```



```

600/600 [=====] - 15s 25ms/step - loss: 5.8000e-04 - val_loss: 5.2407e-04
Epoch 52/1000
600/600 [=====] - 14s 23ms/step - loss: 5.8994e-04 - val_loss: 5.6737e-04
Epoch 53/1000
600/600 [=====] - 14s 23ms/step - loss: 5.8823e-04 - val_loss: 5.1840e-04
Epoch 54/1000
600/600 [=====] - 14s 23ms/step - loss: 5.2922e-04 - val_loss: 5.0591e-04
Epoch 55/1000
600/600 [=====] - 14s 23ms/step - loss: 5.4486e-04 - val_loss: 5.6318e-04
Epoch 56/1000
600/600 [=====] - 14s 23ms/step - loss: 5.2263e-04 - val_loss: 4.6950e-04
Epoch 57/1000
600/600 [=====] - 14s 24ms/step - loss: 5.2487e-04 - val_loss: 6.0037e-04
Epoch 58/1000
600/600 [=====] - 14s 23ms/step - loss: 5.2062e-04 - val_loss: 4.8452e-04
Epoch 59/1000
600/600 [=====] - 14s 23ms/step - loss: 4.9951e-04 - val_loss: 4.9447e-04
Epoch 60/1000
600/600 [=====] - 14s 24ms/step - loss: 4.9400e-04 - val_loss: 5.2970e-04
Epoch 61/1000
599/600 [=====>.] - ETA: 0s - loss: 4.8393e-04
[2023-12-08 02:09:22.791106]: Reconstructing images for epoch 61 ...

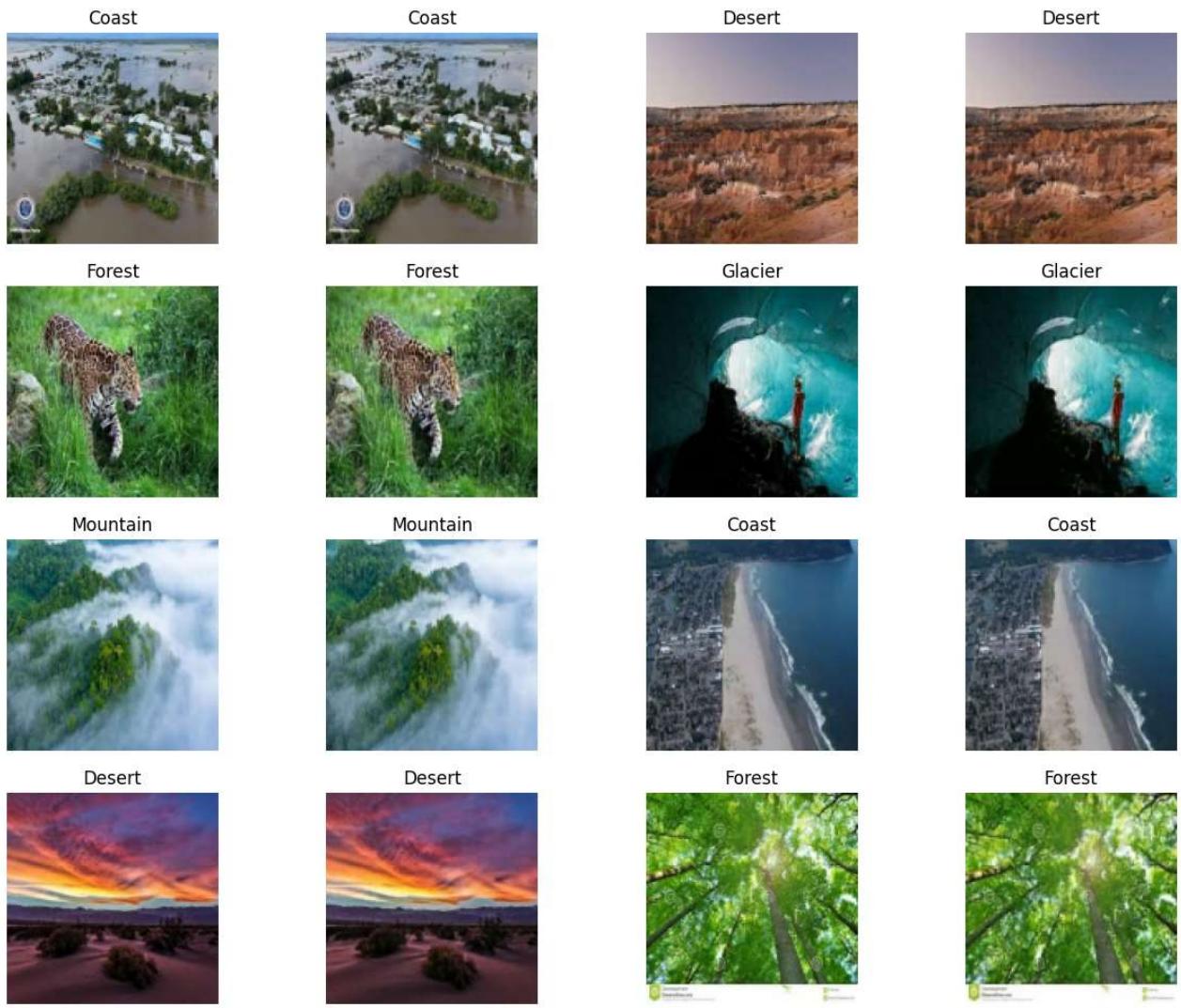
```



```

600/600 [=====] - 17s 28ms/step - loss: 4.8394e-04 - val_loss: 4.6218e-04
Epoch 62/1000
600/600 [=====] - 14s 23ms/step - loss: 4.5282e-04 - val_loss: 4.2208e-04
Epoch 63/1000
600/600 [=====] - 15s 24ms/step - loss: 4.9442e-04 - val_loss: 4.7070e-04
Epoch 64/1000
600/600 [=====] - 15s 24ms/step - loss: 4.6945e-04 - val_loss: 5.1061e-04
Epoch 65/1000
600/600 [=====] - 14s 24ms/step - loss: 4.3405e-04 - val_loss: 4.2528e-04
Epoch 66/1000
600/600 [=====] - 14s 23ms/step - loss: 4.3275e-04 - val_loss: 4.1742e-04
Epoch 67/1000
600/600 [=====] - 14s 23ms/step - loss: 4.6681e-04 - val_loss: 3.5775e-04
Epoch 68/1000
600/600 [=====] - 14s 23ms/step - loss: 4.0206e-04 - val_loss: 4.4943e-04
Epoch 69/1000
600/600 [=====] - 15s 24ms/step - loss: 4.1723e-04 - val_loss: 3.2699e-04
Epoch 70/1000
600/600 [=====] - 14s 24ms/step - loss: 4.7393e-04 - val_loss: 3.8041e-04
Epoch 71/1000
598/600 [=====>.] - ETA: 0s - loss: 3.9259e-04
[2023-12-08 02:11:54.107184]: Reconstructing images for epoch 71 ...

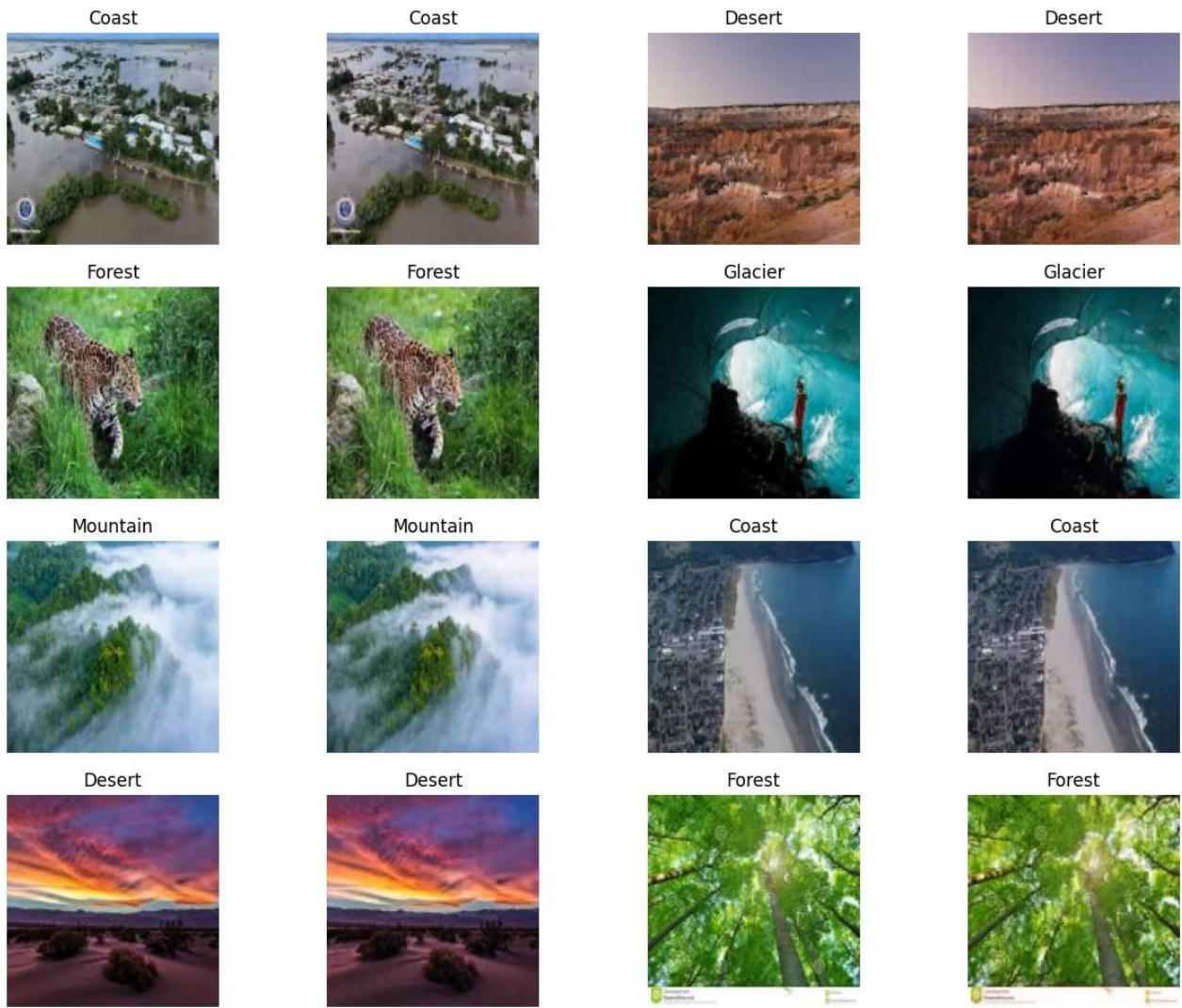
```



```

600/600 [=====] - 16s 27ms/step - loss: 3.9238e-04 - val_loss: 3.7697e-04
Epoch 72/1000
600/600 [=====] - 14s 23ms/step - loss: 4.0651e-04 - val_loss: 3.3320e-04
Epoch 73/1000
600/600 [=====] - 14s 24ms/step - loss: 3.9286e-04 - val_loss: 4.2687e-04
Epoch 74/1000
600/600 [=====] - 15s 24ms/step - loss: 4.0156e-04 - val_loss: 4.2454e-04
Epoch 75/1000
600/600 [=====] - 14s 23ms/step - loss: 3.9173e-04 - val_loss: 3.8693e-04
Epoch 76/1000
600/600 [=====] - 15s 24ms/step - loss: 3.8135e-04 - val_loss: 4.0964e-04
Epoch 77/1000
600/600 [=====] - 14s 24ms/step - loss: 3.8389e-04 - val_loss: 3.2859e-04
Epoch 78/1000
600/600 [=====] - 14s 23ms/step - loss: 3.5842e-04 - val_loss: 4.8822e-04
Epoch 79/1000
600/600 [=====] - 15s 24ms/step - loss: 3.8313e-04 - val_loss: 3.0509e-04
Epoch 80/1000
600/600 [=====] - 14s 24ms/step - loss: 3.5707e-04 - val_loss: 4.4852e-04
Epoch 81/1000
600/600 [=====] - ETA: 0s - loss: 3.6283e-04
[2023-12-08 02:14:23.501579]: Reconstructing images for epoch 81 ...

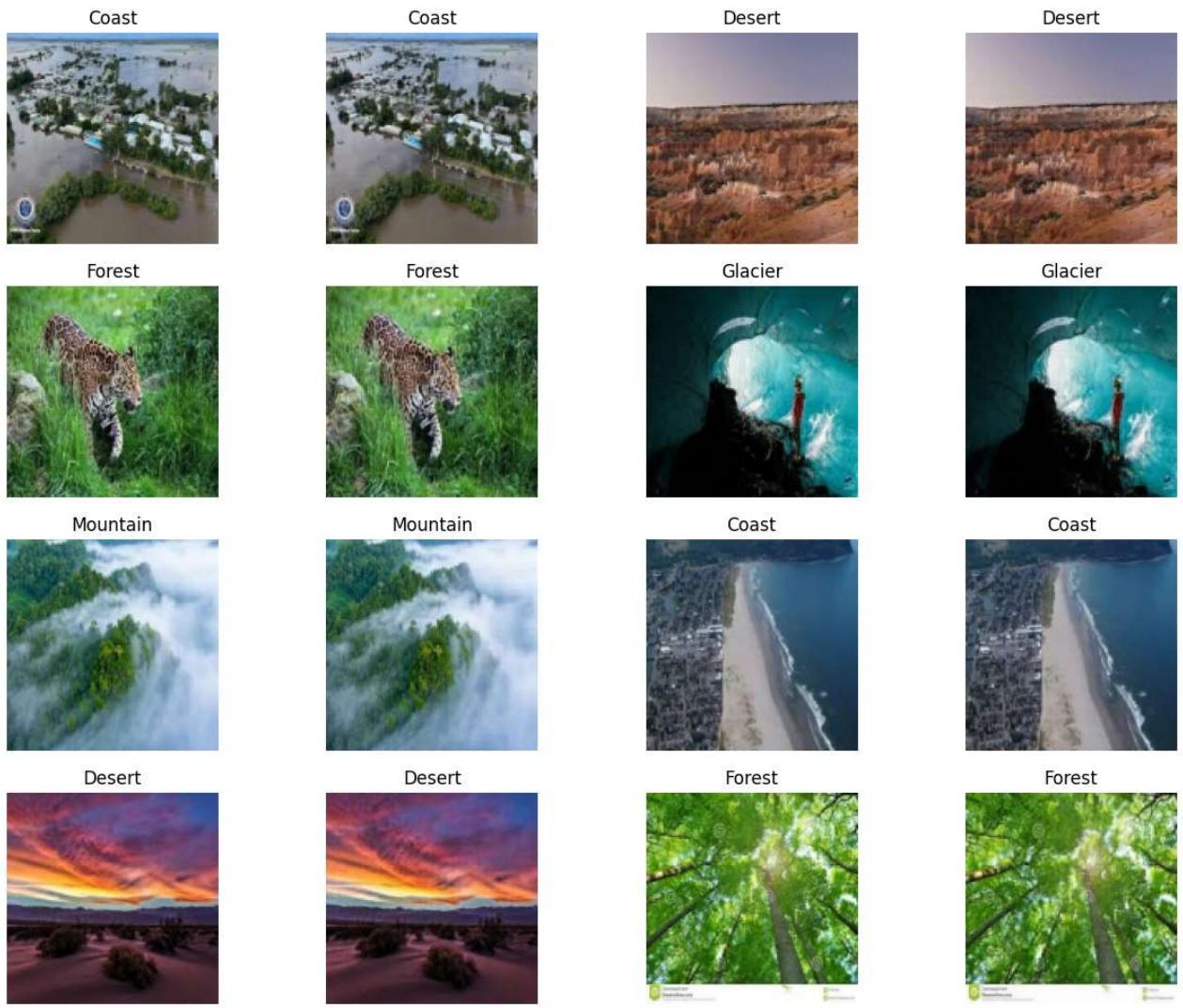
```



```

600/600 [=====] - 16s 26ms/step - loss: 3.6283e-04 - val_loss: 5.6804e-04
Epoch 82/1000
600/600 [=====] - 15s 24ms/step - loss: 3.5712e-04 - val_loss: 2.9254e-04
Epoch 83/1000
600/600 [=====] - 16s 26ms/step - loss: 3.5171e-04 - val_loss: 2.8426e-04
Epoch 84/1000
600/600 [=====] - 14s 23ms/step - loss: 3.2867e-04 - val_loss: 4.1236e-04
Epoch 85/1000
600/600 [=====] - 15s 24ms/step - loss: 3.5868e-04 - val_loss: 3.1762e-04
Epoch 86/1000
600/600 [=====] - 15s 24ms/step - loss: 3.2197e-04 - val_loss: 2.7550e-04
Epoch 87/1000
600/600 [=====] - 14s 23ms/step - loss: 3.4292e-04 - val_loss: 3.1664e-04
Epoch 88/1000
600/600 [=====] - 15s 24ms/step - loss: 3.1995e-04 - val_loss: 3.2966e-04
Epoch 89/1000
600/600 [=====] - 14s 24ms/step - loss: 3.0722e-04 - val_loss: 3.7716e-04
Epoch 90/1000
600/600 [=====] - 14s 23ms/step - loss: 3.3434e-04 - val_loss: 3.4723e-04
Epoch 91/1000
599/600 [=====>.] - ETA: 0s - loss: 3.4206e-04
[2023-12-08 02:16:49.994694]: Reconstructing images for epoch 91 ...

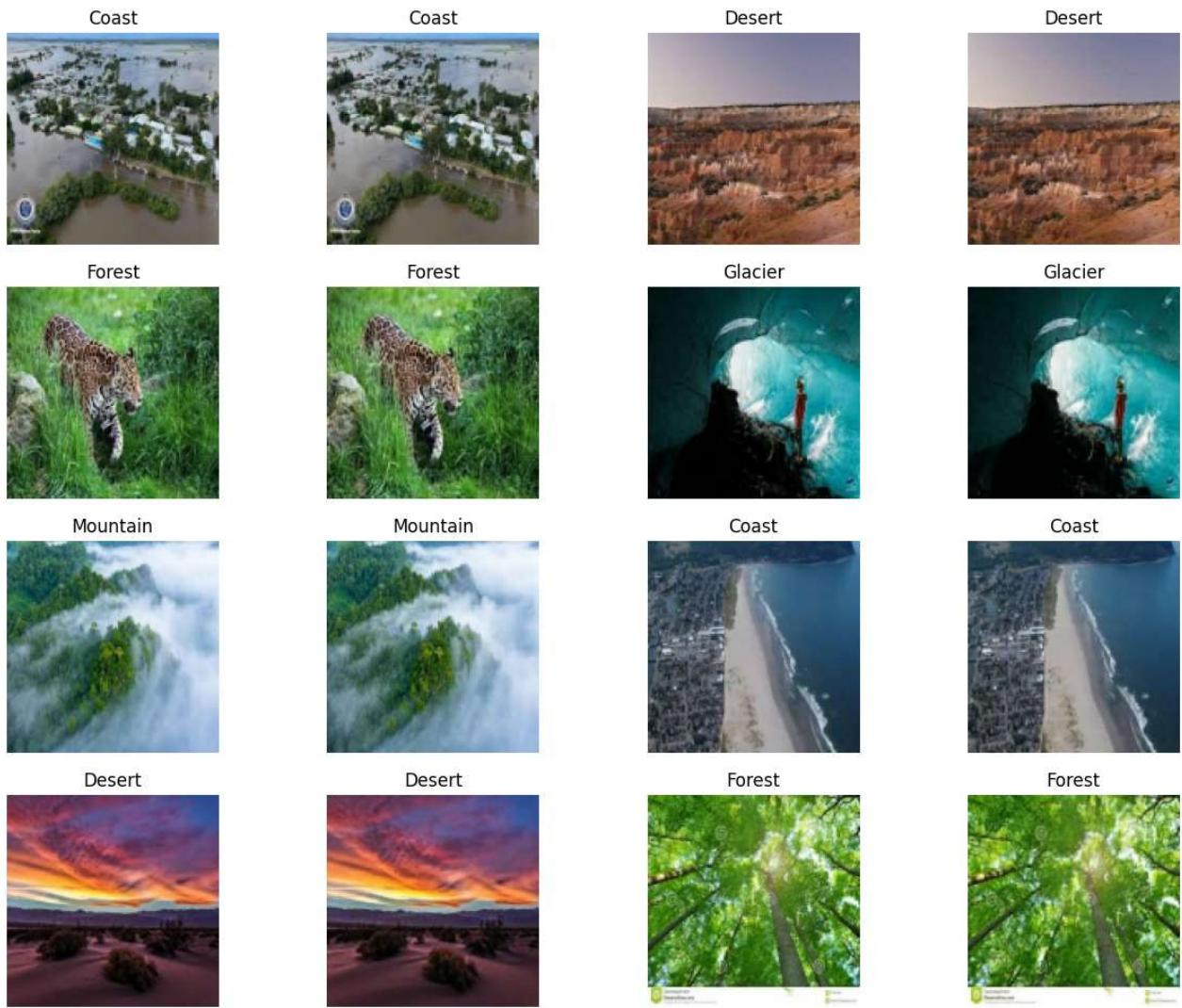
```



```

600/600 [=====] - 16s 26ms/step - loss: 3.4199e-04 - val_loss: 2.7269e-04
Epoch 92/1000
600/600 [=====] - 14s 24ms/step - loss: 3.0825e-04 - val_loss: 2.8522e-04
Epoch 93/1000
600/600 [=====] - 15s 24ms/step - loss: 3.0432e-04 - val_loss: 3.2260e-04
Epoch 94/1000
600/600 [=====] - 14s 24ms/step - loss: 3.1181e-04 - val_loss: 5.9856e-04
Epoch 95/1000
600/600 [=====] - 14s 23ms/step - loss: 2.9132e-04 - val_loss: 2.5947e-04
Epoch 96/1000
600/600 [=====] - 14s 23ms/step - loss: 3.0799e-04 - val_loss: 2.4715e-04
Epoch 97/1000
600/600 [=====] - 14s 23ms/step - loss: 2.9783e-04 - val_loss: 2.7607e-04
Epoch 98/1000
600/600 [=====] - 14s 23ms/step - loss: 2.7329e-04 - val_loss: 2.3864e-04
Epoch 99/1000
600/600 [=====] - 14s 23ms/step - loss: 2.8105e-04 - val_loss: 4.0892e-04
Epoch 100/1000
600/600 [=====] - 14s 23ms/step - loss: 2.9461e-04 - val_loss: 2.4860e-04
Epoch 101/1000
599/600 [=====>.] - ETA: 0s - loss: 2.8581e-04
[2023-12-08 02:19:12.655439]: Reconstructing images for epoch 101 ...

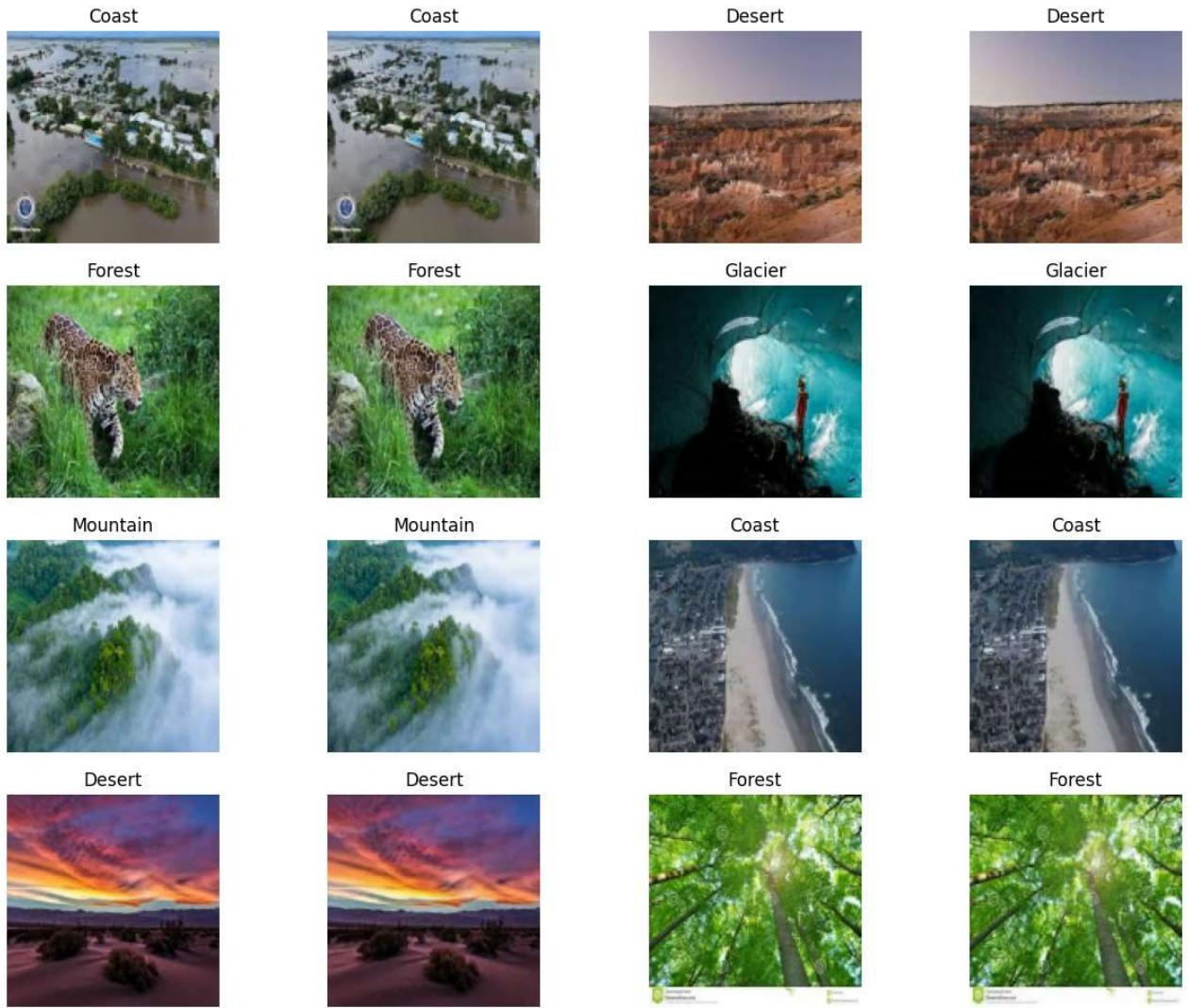
```



```

600/600 [=====] - 15s 25ms/step - loss: 2.8574e-04 - val_loss: 2.6317e-04
Epoch 102/1000
600/600 [=====] - 14s 24ms/step - loss: 2.6574e-04 - val_loss: 5.1267e-04
Epoch 103/1000
600/600 [=====] - 14s 24ms/step - loss: 2.7880e-04 - val_loss: 2.2781e-04
Epoch 104/1000
600/600 [=====] - 15s 24ms/step - loss: 2.6929e-04 - val_loss: 2.4659e-04
Epoch 105/1000
600/600 [=====] - 14s 24ms/step - loss: 2.6256e-04 - val_loss: 3.4905e-04
Epoch 106/1000
600/600 [=====] - 15s 24ms/step - loss: 2.5876e-04 - val_loss: 2.1086e-04
Epoch 107/1000
600/600 [=====] - 14s 24ms/step - loss: 2.7063e-04 - val_loss: 1.8914e-04
Epoch 108/1000
600/600 [=====] - 14s 24ms/step - loss: 2.6411e-04 - val_loss: 3.2159e-04
Epoch 109/1000
600/600 [=====] - 15s 24ms/step - loss: 2.6561e-04 - val_loss: 2.4472e-04
Epoch 110/1000
600/600 [=====] - 14s 23ms/step - loss: 2.3913e-04 - val_loss: 2.0721e-04
Epoch 111/1000
600/600 [=====] - ETA: 0s - loss: 2.4964e-04
[2023-12-08 02:21:38.965305]: Reconstructing images for epoch 111 ...

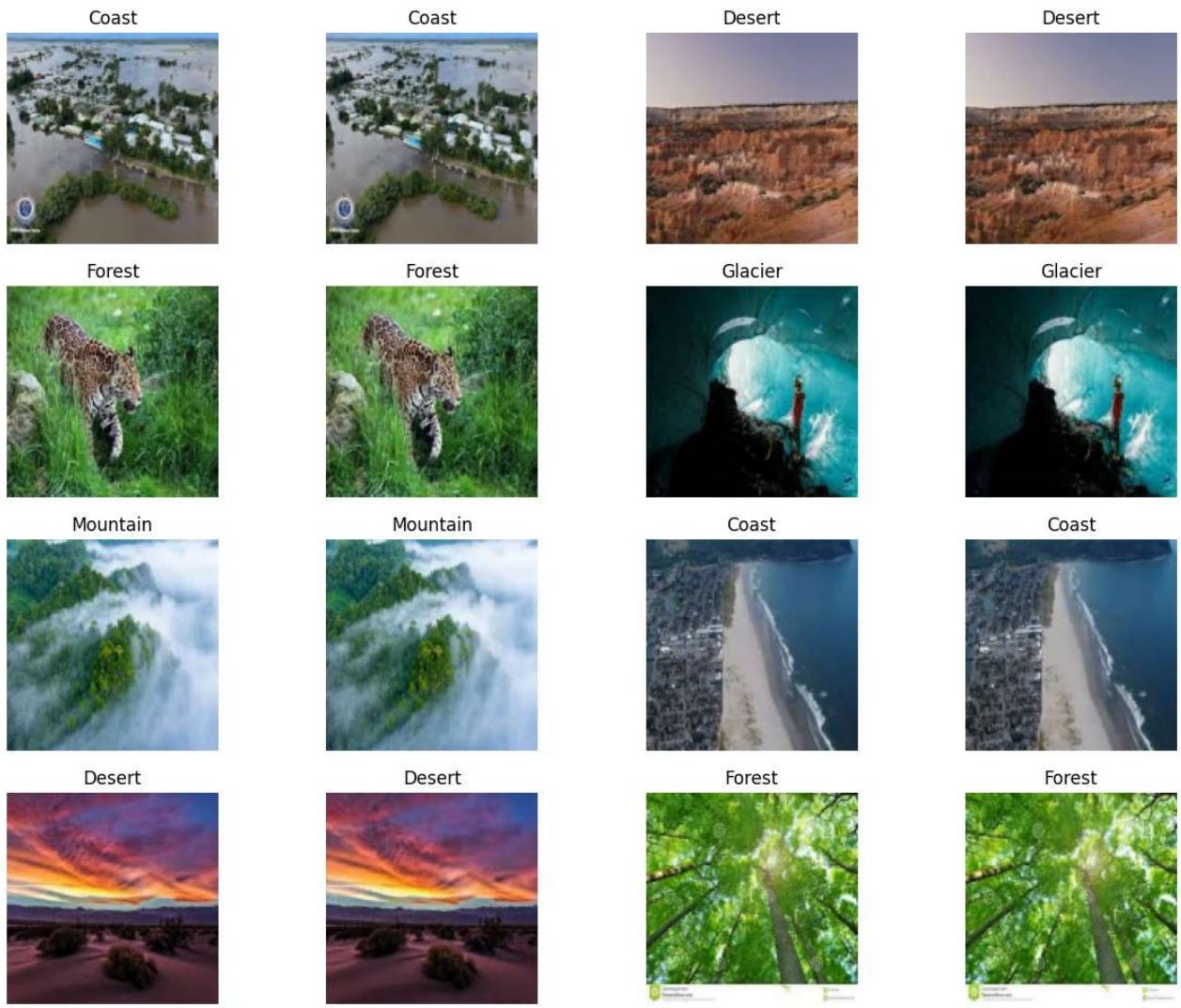
```



```

600/600 [=====] - 16s 27ms/step - loss: 2.4964e-04 - val_loss: 2.3325e-04
Epoch 112/1000
600/600 [=====] - 14s 24ms/step - loss: 2.2848e-04 - val_loss: 2.8700e-04
Epoch 113/1000
600/600 [=====] - 14s 24ms/step - loss: 2.7190e-04 - val_loss: 2.1433e-04
Epoch 114/1000
600/600 [=====] - 14s 24ms/step - loss: 2.3115e-04 - val_loss: 2.0722e-04
Epoch 115/1000
600/600 [=====] - 15s 24ms/step - loss: 2.3195e-04 - val_loss: 2.5101e-04
Epoch 116/1000
600/600 [=====] - 14s 23ms/step - loss: 2.4041e-04 - val_loss: 2.7240e-04
Epoch 117/1000
600/600 [=====] - 14s 24ms/step - loss: 2.4682e-04 - val_loss: 1.8310e-04
Epoch 118/1000
600/600 [=====] - 14s 24ms/step - loss: 2.1683e-04 - val_loss: 1.7699e-04
Epoch 119/1000
600/600 [=====] - 14s 24ms/step - loss: 2.2889e-04 - val_loss: 3.0110e-04
Epoch 120/1000
600/600 [=====] - 15s 24ms/step - loss: 2.2819e-04 - val_loss: 1.8387e-04
Epoch 121/1000
598/600 [=====>.] - ETA: 0s - loss: 2.3778e-04
[2023-12-08 02:24:05.102194]: Reconstructing images for epoch 121 ...

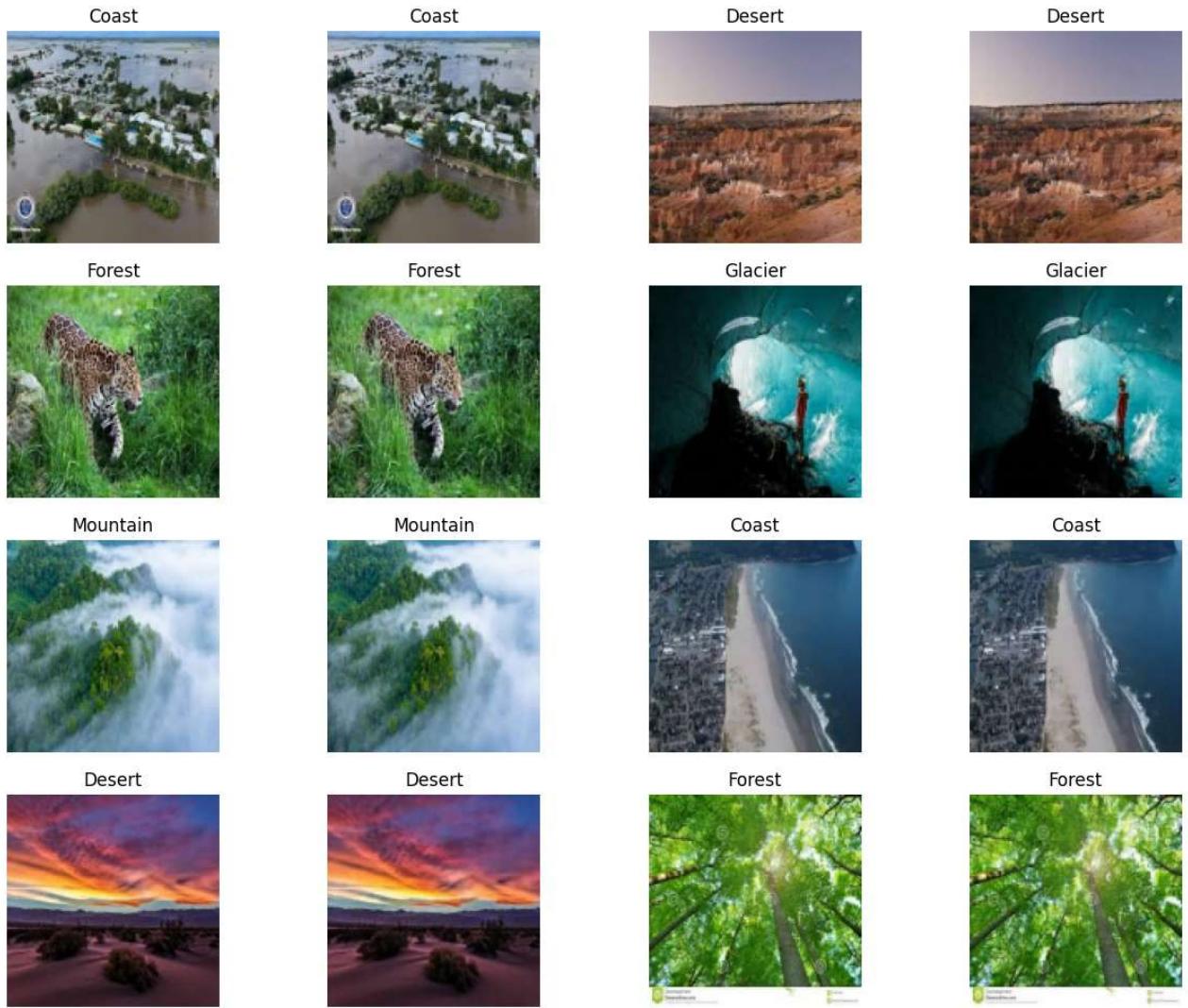
```



```

600/600 [=====] - 16s 26ms/step - loss: 2.3763e-04 - val_loss: 1.8425e-04
Epoch 122/1000
600/600 [=====] - 14s 24ms/step - loss: 2.1927e-04 - val_loss: 2.1291e-04
Epoch 123/1000
600/600 [=====] - 15s 24ms/step - loss: 2.2345e-04 - val_loss: 2.1394e-04
Epoch 124/1000
600/600 [=====] - 15s 25ms/step - loss: 2.0508e-04 - val_loss: 1.5255e-04
Epoch 125/1000
600/600 [=====] - 14s 24ms/step - loss: 2.2008e-04 - val_loss: 2.0206e-04
Epoch 126/1000
600/600 [=====] - 15s 24ms/step - loss: 2.0819e-04 - val_loss: 1.9459e-04
Epoch 127/1000
600/600 [=====] - 15s 25ms/step - loss: 2.1973e-04 - val_loss: 2.3297e-04
Epoch 128/1000
600/600 [=====] - 14s 24ms/step - loss: 2.1205e-04 - val_loss: 4.0179e-04
Epoch 129/1000
600/600 [=====] - 14s 24ms/step - loss: 2.2573e-04 - val_loss: 1.8042e-04
Epoch 130/1000
600/600 [=====] - 15s 24ms/step - loss: 1.9495e-04 - val_loss: 2.2499e-04
Epoch 131/1000
598/600 [=====>.] - ETA: 0s - loss: 2.0863e-04
[2023-12-08 02:26:44.835735]: Reconstructing images for epoch 131 ...

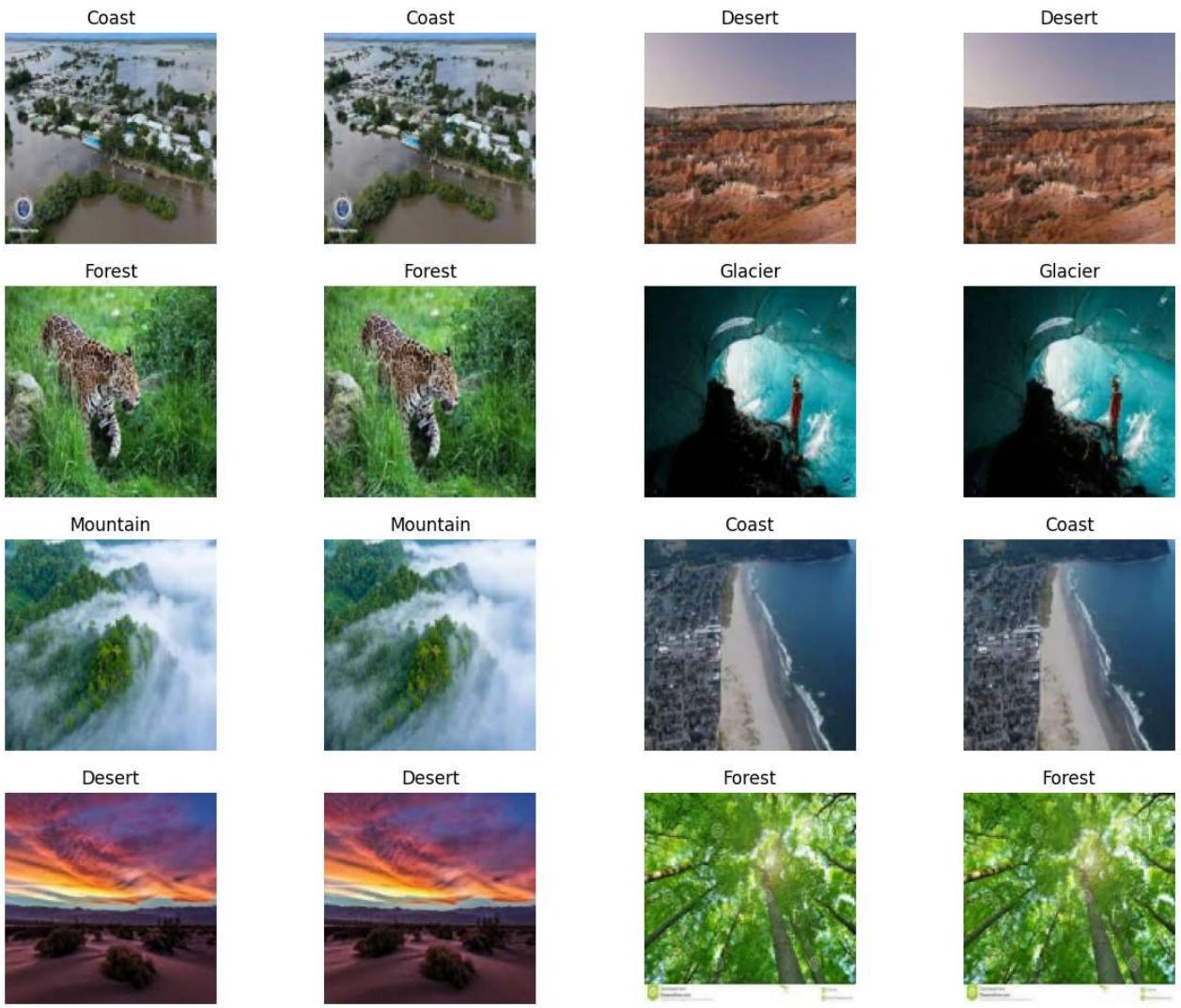
```



```

600/600 [=====] - 15s 25ms/step - loss: 2.0881e-04 - val_loss: 2.0282e-04
Epoch 132/1000
600/600 [=====] - 14s 24ms/step - loss: 2.0524e-04 - val_loss: 1.8362e-04
Epoch 133/1000
600/600 [=====] - 14s 24ms/step - loss: 1.9820e-04 - val_loss: 1.5983e-04
Epoch 134/1000
600/600 [=====] - 15s 24ms/step - loss: 2.1234e-04 - val_loss: 2.4102e-04
Epoch 135/1000
600/600 [=====] - 15s 24ms/step - loss: 2.1147e-04 - val_loss: 1.4608e-04
Epoch 136/1000
600/600 [=====] - 14s 23ms/step - loss: 1.8991e-04 - val_loss: 1.7467e-04
Epoch 137/1000
600/600 [=====] - 14s 23ms/step - loss: 2.0289e-04 - val_loss: 1.7854e-04
Epoch 138/1000
600/600 [=====] - 14s 23ms/step - loss: 2.0839e-04 - val_loss: 4.1089e-04
Epoch 139/1000
600/600 [=====] - 14s 24ms/step - loss: 2.0445e-04 - val_loss: 2.3411e-04
Epoch 140/1000
600/600 [=====] - 14s 23ms/step - loss: 1.9887e-04 - val_loss: 1.5344e-04
Epoch 141/1000
598/600 [=====>.] - ETA: 0s - loss: 1.9709e-04
[2023-12-08 02:29:09.545948]: Reconstructing images for epoch 141 ...

```



```

600/600 [=====] - 16s 26ms/step - loss: 1.9690e-04 - val_loss: 1.4519e-04
Epoch 142/1000
600/600 [=====] - 14s 23ms/step - loss: 1.9421e-04 - val_loss: 1.4830e-04
Epoch 143/1000
600/600 [=====] - 14s 23ms/step - loss: 1.8591e-04 - val_loss: 2.0446e-04
Epoch 144/1000
600/600 [=====] - 14s 24ms/step - loss: 1.9293e-04 - val_loss: 1.7992e-04
Epoch 145/1000
600/600 [=====] - 14s 23ms/step - loss: 1.8957e-04 - val_loss: 1.6434e-04
Epoch 146/1000
600/600 [=====] - 14s 23ms/step - loss: 1.9992e-04 - val_loss: 1.7905e-04
Epoch 147/1000
600/600 [=====] - 14s 23ms/step - loss: 1.8336e-04 - val_loss: 1.9877e-04
Epoch 148/1000
600/600 [=====] - 14s 23ms/step - loss: 1.8145e-04 - val_loss: 1.5419e-04
Epoch 149/1000
600/600 [=====] - 15s 24ms/step - loss: 1.9167e-04 - val_loss: 2.7105e-04
Epoch 150/1000
600/600 [=====] - 14s 23ms/step - loss: 1.8335e-04 - val_loss: 1.4280e-04
Epoch 151/1000
598/600 [=====>..] - ETA: 0s - loss: 1.8542e-04
[2023-12-08 02:31:33.622263]: Reconstructing images for epoch 151 ...
Buffered data was truncated after reaching the output size limit.

```

