

3. Status of Responses to the Great East Japan Earthquake and Tsunami

(1) Source: Records of the Great East Japan Earthquake: Miyako City, Iwate Prefecture. Status of Responses to the Great East Japan Earthquake (Final Report) as of Aug. 31, 2012

1. Status of Earthquake (According to a Release by the Japan Meteorological Agency)

- (1) Time of occurrence: at about 14:46 on Mar. 11, 2011
- (2) Epicenter: Off the coast of Sanriku (lat 38° 1' N, long 142° 9' E, about 130 km ESE of the Oshika Peninsula)
- (3) Focal depth: about 24 km
- (4) Magnitude at hypocenter: a magnitude of 9.0 (released on Mar. 13, 2011, by the Japan Meteorological Agency)
- (5) Seismic intensity: 5-upper in Moichi
5-lower in Satsuki-cho, Kuwagasaki, Nagasawa, Taro, Kawai, and Kadoma-Tashiro
- (6) Issuance of warnings and advisories: at 14:49 on Mar. 11, 2011, Major tsunami warning for Iwate Prefecture
At 20:20 on Mar. 12, 2011, Downgraded to tsunami warning
At 7:30 on Mar. 13, 2011, Downgraded to tsunami advisory
At 17:58 on Mar. 13, 2011, Tsunami advisory canceled

2. Status of Tsunami (According to a Release by the Japan Meteorological Agency)

- (1) Largest wave at 15:26 on Mar. 11, 2011; over 8.5 m in height (*1)
Tsunami height estimated based on traces etc.: 7.3 m (*2)
- *1 According to analysis of records at tsunami observation points recovered on-site at a later date.
*2 Survey results of tsunami height based on tsunami traces etc. at tsunami observation points (released on Apr. 5, 2011, by Morioka Meteorological Office)
- (For reference) Tsunami run-up height (the height of land up to which the tsunami reached)
- Taro Koborinai neighborhood: 37.9 m (according to a release by Earthquake Research Institute, University of Tokyo)
 - Omoe Aneyoshi neighborhood: 40.5 m (according to a release by The 2011 Tohoku Earthquake Tsunami Joint Survey (TTJS) Group)

3. Establishment and Removal of Miyako City Headquarters for Disaster Countermeasures

- (1) Establishment of Miyako City Headquarters for Disaster Countermeasures: at 14:46 on Mar. 11, 2011
 - (2) Removal of Miyako City Headquarters for Disaster Countermeasures: at 17:00 on Aug. 31, 2012
- * So far, Miyako City Headquarters for Disaster Countermeasures Meeting (joint meeting with related authorities) has been held for 78 times to coordinate activities.

4. Closing of Floodgates and Sluice Gates

- (1) At the time of the issuance of warning, 111 floodgates and sluice gates were closed (93 gates in the Miyako neighborhood, 18 gates in the Taro neighborhood)
- * There were 25 places that sustained damage, including 11 places in the Miyako neighborhood and 14 places in the Taro neighborhood.

5. Status of Evacuation

- (1) Issuance of evacuation order: at 14:49 on Mar. 11, 2011
- (2) Cancellation of evacuation order: at 17:58 on Mar. 13, 2011
- (3) People subject to evacuation order: 5,277 households, 12,842 people
- (4) No. of evacuees: up to 8,889 individuals at 85 places (All designated shelters were closed on Aug. 10, 2011)
- (5) Responses to evacuees

Provision of food, distribution of boiled rice (at some shelters), provision of water, provision of blankets, provision of daily necessities, installation of temporary latrines (at some shelters), assistance for bathing (at some shelters), provision of medical treatment (medical teams from Miyako Medical Association), Installation of satellite phones (at some shelters), etc.

6. State of Damage

- (1) Casualties and damage to dwellings etc. (as of Aug. 3, 2012)

Casualties				Damage to dwellings etc.				
Deaths with certificate	Declared deaths in absentia	Total	People missing	Completely destroyed	Severely destroyed	Partially destroyed	Partially damaged	Total
407	110	517	96	5,968	1,335	1,174	611	9,088

* The declared deaths in absentia overlap the people missing. The difference (14 people) between the number of declared deaths in absentia (110 people) and that of the people missing (96 people) stands for the number of people who have been identified after the submission of a death declaration by way of the remains or DNA typing.

7. Status of Restoration of Lifelines

- (1) Power (according to a release by Tohoku Electric Power)

- Mar. 14: Restored in the Iwate Prefectural Miyako Hospital and Iwate Prefectural Regional Development Bureau
- Mar. 21: Among 16,000 cases of power outage, about 4,000 have been swept away. Restoration work continued for about 12,000 cases.
- Mar. 25: Power restored to the City Hall (generators had been used in the interim); power restored to 40% of the City (house-to-house restoration)
- Apr. 15: The Tohoku Electric Power branch office received power.
- Apr. 30: Restoration completed for the City.

- (2) Waterworks

- Mar. 14: A restoration rate of 60%
- Mar. 18: A restoration rate of 76%
- Mar. 24: A restoration rate of 90%
- Apr. 15: A restoration rate of 100%

- (3) Communications

- Fixed telephones

- Mar. 30: Restored in the Miyako Telephone Office
- Mar. 31: Optical cables restored in the City Hall.
- Apr. 15: Restored across the City (Restored in all neighborhoods of the City)

- Mobile phones

- Mar. 21: NTT docomo service partially restored (Service restored in areas excluding the Omoe and Taro neighborhoods.)
- Apr. 15: NTT docomo and au service completely restored; SoftBank service temporarily restored (available for use with au, NTT docomo (excluding the periphery of Omoesato, Todogasaki, and Nakanohama)), and SoftBank

○ Specially installed pay phones

- Mar. 14: NTT's pay phones, satellite phones etc. were installed at shelters.
- Mar. 22: Emergency disaster broadcasting by Miyako Emergency FM 77.4 MHz

(4) Public transport

○ JR Yamada Line

- Mar. 26: Normal service resumed between Miyako and Morioka; replacement buses are operated between Miyako and Iwate Funakoshi and at the Iwaizumi Line.

(Railroad tracks have been swept away from the Hei River Railroad Bridge, which broke down, to Tsugaruishi. Restoration methods are being considered.)

○ Sanriku Railway

- Mar. 20: A shuttle service between Miyako and Omoto started with three round trips per day.
- Mar. 29: In operation with four round trips per day.

○ Kenpoku Bus

- Mar. 16: Bus Line 106 resumed service.
- Mar. 18: Service resumed in all lines.

(5) Roads

- For national highway routes, road-clearing work started on major trunk roads on the date of the disaster. Police started to regulate traffic.

- In coordination with national highway routes and prefectural roads, road-clearing work started at major municipal roads in order.

- Mar. 14: National Highway Routes come into service.
- Mar. 16: The prefectural road Omoe Peninsula Line come into service.
- Mar. 23: Removal of wrecked left on public road completed. (1,300 cars)
- Mar. 29: Road clearing work mostly completed.
- Apr. 15: Removal of debris left on sidewalks completed. Moving to the main restoration work from now on.
- Jul. 31: Blockage at the Tateai railroad crossing on the JR Yamada Line was canceled.

8. Other

(1) Quick-fix temporary houses (Houses for initial applicants have been occupied by Aug. 11, 2011)

No. of houses built		Status of occupation (Having been occupied by Jul. 6, 2012)		
No. of places	No. of houses	No. of places occupied	No. of houses	No. of residents
62	2, 0 1 0	60	1, 7 1 3	3, 8 8 3

(2) Principal systems that have been applied

- Designation as serious disaster (decided upon by the Cabinet on Mar. 12, 2011)
- Application of the Disaster Relief Act (decided by the governor of Iwate Prefecture on Mar. 12, 2011)
- Application of the Act Concerning Support for Reconstructing Livelihoods of Disaster Victims (decided by the governor of Iwate Prefecture on Mar. 12, 2011)

4. Number of People Killed and Missing by the Great East Japan Earthquake and Tsunami

As of Nov. 6, 2012

■ Age Group (The number of declared deaths in absentia under the people killed column overlaps that under the people missing column.)

Age group	People killed			People missing
	Deaths with certificate	Declared deaths in absentia	Total	*Declared deaths in absentia
0-9	10	9	19	9
10-19	2		2	
20-29	10	5	15	5
30-39	16	11	27	8
40-49	28	11	39	10
50-59	56	14	70	11
60-69	91	31	122	25
70-79	106	20	126	19
80-89	74	9	83	7
90-99	14		14	
Total	407	110	517	94

■ Sex (The number of declared deaths in absentia under the people killed column overlaps that under the people missing column.)

Sex	People killed			People missing
	Deaths with certificate	Declared deaths in absentia	Total	*Declared deaths in absentia
Male	182	69	251	59
Female	225	41	266	35
Total	407	110	517	94

■ Address (The number of declared deaths in absentia under the people killed column overlaps that under the people missing column.)

Neighborhood	People killed			People missing
	Deaths with certificate	Declared deaths in absentia	Total	*Declared deaths in absentia
Miyako	63	5	68	5
Kuwagasaki	48	9	57	8
Sentoku	11	1	12	1
Sokei	58	7	65	7
Sakiyama	8	14	22	9
Hanawa	5	1	6	
Tsugaruishi	53	4	57	3
Omoe	24	24	48	20
Taro	136	45	181	41
Niisato	1		1	
Total	407	110	517	94

□ “Deaths with certificate” refer to people who had resident registration with Miyako City as of Mar. 11, 2011, and who died of a cause directly related to the Great East Japan Earthquake and Tsunami (the cause of death being drowning, pneumonia etc.)

□ The difference (16 people) between the number of declared deaths in absentia under the People killed column (110 people) and that under the People missing column (94 people) stands for the number of people who have been identified after the submission of a death declaration by way of the remains or DNA typing.

Neighborhood	People killed			People missing	
	Deaths with certificate	Declared deaths in absentia	Total	*Declared deaths in absentia	
Miyako	Shinkawa-cho	7		7	
	Mukai-machi	24	1	25	1
	Odori	2		2	
	Tateai-cho	1		1	
	Nishi-machi	1		1	
	Yamaguchi	5		5	
	Hokuda		1	1	1
	Kurota-machi	2		2	
	Tsukiji	9	2	11	2
	Atago	1		1	
	Koganji	11		11	
	Miyazono		1	1	1
		63	5	68	5
Kuwagasaki	Kuwagasaki	17	3	20	3
	Nakasato-danchi	1		1	
	Hikage-cho	1		1	
	Kumano-cho	3	2	5	2
	Takonohama-cho	17	1	18	1
	Yamane-cho	5	1	6	1
	Minato-machi	1		1	
	Hitachihama-cho	3	1	4	1
	Hinode-cho		1	1	
		48	9	57	8
Sentoku	Chikanai	3		3	
	Nishigaoka	1		1	
	Nagane	4	1	5	1
	Ota	1		1	
	Kanpana	1		1	
	Itaya	1		1	
		11	1	12	1

Neighborhood	People killed			People missing	
	Deaths with certificate	Declared deaths in absentia	Total	*Declared deaths in absentia	
Sokei	Fujiwara	5	1	6	1
	Koyamada	3	1	4	1
	Sokei	8		8	
	Wamura	1	1	2	1
	Kanan	1		1	
	Kanbayashi	3	1	4	1
	Fujinokawa	2		2	
	Yagisawa	4	1	5	1
	Takahama	4	1	5	1
	Kanehama	27	1	28	1
		58	7	65	7
Sakiyama	Sakiyama	3	1	4	
	Sakikuwagasaki	5	13	18	9
	8	14	22	9	
Hanawa	Takusari	1		1	
	Matsuyama	1		1	
	Roki		1	1	
	Nagasawa	3		3	
	5	1	6		
Tsugaruishi	Tsugaruishi	28	3	31	2
	Akamae	25	1	26	1
	53	4	57	3	
Omoe	Omoe	21	23	44	19
	Otobe	3	1	4	1
	24	24	48	20	
Taro	Taro	136	45	181	41
		136	45	181	41
Niisato	Kariya	1		1	
		1		1	
	Total	407	110	517	94

5. Number of Houses Destroyed by the Great East Japan Earthquake and Tsunami

■ Breakdown of the Number of Destroyed Houses (as of Jun. 29, 2012)

Unit: houses

Neighborhood	Dwellings					Non-dwelling houses				
	Completely destroyed	Severely destroyed	Partially destroyed	Partially damaged	Total	Completely destroyed	Severely destroyed	Partially destroyed	Partially damaged	Total
Miyako	461	242	208	170	1,081	447	233	168	71	919
Kuwagasaki	527	16	16	36	595	487	11	9	10	517
Fujiwara	82	129	85	27	323	123	114	59	9	305
Sokei	133	109	146	80	468	185	81	118	18	402
Takahama	66	34	29	11	140	99	41	29	9	178
Kanehama	129	5	1	5	140	159	5	2	1	167
Shirahama	15	2	4	4	25	43	2	5	0	50
Sakiyama	40	4	10	27	81	90	4	1	7	102
Hanawa	0	0	1	10	11	0	0	3	7	10
Tsugaruishi	414	116	104	49	683	538	124	88	20	770
Omoe	81	4	3	8	96	295	11	6	6	318
Taro	729	27	32	13	801	821	21	45	3	890
Niisato	0	0	1	2	3	3	0	1	5	9
Kawai	0	0	0	2	2	1	0	0	1	2
Total	2,677	688	640	444	4,449	3,291	647	534	167	4,639

Neighborhood	Total				
	Completely destroyed	Severely destroyed	Partially destroyed	Partially damaged	Total
Miyako	908	475	376	241	2,000
Kuwagasaki	1,014	27	25	46	1,112
Fujiwara	205	243	144	36	628
Sokei	318	190	264	98	870
Takahama	165	75	58	20	318
Kanehama	288	10	3	6	307
Shirahama	58	4	9	4	75
Sakiyama	130	8	11	34	183
Hanawa	0	0	4	17	21
Tsugaruishi	952	240	192	69	1,453
Omoe	376	15	9	14	414
Taro	1,550	48	77	16	1,691
Niisato	3	0	2	7	12
Kawai	1	0	0	3	4
Total	5,968	1,335	1,174	611	9,088

■ Breakdown of the Number of Destroyed Houses (Preliminary Data as of the Early Phase After the Occurrence of Disaster)

Neighborhood	Completely destroyed	Severely destroyed	Partially destroyed	Inundated above floor level	Inundated below floor level	Total
Miyako	722	647	118	1,262	247	2,996
Kuwagasaki	646	136		33		815
Sakiyama	148	24		17	6	195
Hanawa						0
Tsugaruishi	426	136	57	287	56	962
Omoe	118	4	1	11	2	136
Taro	1,609	59		150	12	1,830
Total	3,669	1,006	176	1,760	323	6,934

* The figures as of Jun. 29, 2012, have been calculated from resident card information at the time of the earthquake disaster and counting the number of applications for disaster sufferer certificate. Buildings for which redundant counting is suspected have been checked using house maps.

■ Amount of housing damage

Completely destroyed	Severely destroyed	Partially destroyed	Partially damaged
123,537,600,000 yen	13,817,250,000 yen	9,720,720,000 yen	2,529,540,000 yen
Total: 149,605,110,000 yen			

6. Total Estimated Amount of Damage by the Great East Japan Earthquake and Tsunami

245,660,884,000 yen

Damage category	Estimated amount of damage (in thousand yen)	Survey rate (%)	Remarks
Government buildings	470,178	100	Damage to government buildings, structures, fixtures etc.
Communications facilities	9,366	100	Damage to community television reception facilities
Social welfare facilities	1,745,167	100	Damage to buildings and facilities
Social education facilities	523,705	100	Damage to buildings and facilities
Cultural facilities	1,115,000	100	Damage to buildings and facilities
Athletic facilities	655,467	100	Damage to buildings and facilities
Waterworks facilities	341,000	100	Damage to waterworks and small water supply facilities
Medical/Health facilities	1,692,365	100	Damage to hospitals, Health Center etc.
Firefighting and disaster prevention facilities	780,536	100	Damage to government buildings, machinery, facilities etc.
Tourist facilities	13,600,504	100	Damage to public facilities and guesthouse facilities
Commerce-, industry- and labor-related facilities	28,107,000	100	Commerce-related and industry-related damage
Fisheries-related	21,506,426	100	Damage to fisheries facilities, fishing boats, fishing implements, farming facilities, and aquatic products
Fishing harbor facilities	15,033,087	100	Damage to fishing harbor facilities, coastal facilities, fishing ground facilities, and fishing village facilities
Agricultural facilities	36,080	100	Damage to agricultural facilities
Livestock-related	621	100	Damage to livestock products
Farmland and agricultural facilities	1,629,325	100	Damage to farmland, agricultural facilities, and coastal protection facilities
Forestry-related	426,920	100	Damage to forestry facilities, forest products, and forests
Public works facilities	7,738,258	100	Damage to rivers, roads, bridges, parks, and sewer
Public housing etc.	422,393	100	Damage to public housing
Schools	210,292	100	Damage to buildings, structures, land, facilities etc.
Cultural properties	12,084	100	Damage to cultural properties
Housing	149,605,110	100	The estimation method by Development Bank of Japan, Inc. in "Damage to Housing Capital Stock" has been applied with necessary modifications.

Breakdown of Estimated Amount of Damage by the Great East Japan Earthquake by Damage Category

Damage category	Breakdown (Estimated amount of damage/Name of facilities etc./State of damage)
Government buildings etc. 470,178,000 yen	[Main government buildings etc.] (266,633,000 yen/Main government buildings: 2 places, branch government buildings/Inundated above floor level) [Odori Hall] (26,887,000 yen/Partially destroyed) [Damage to equipment] (167,658,000 yen/First floor of the main government building, official vehicles: 71 cars, a set of computers) [Garage of the Taro General Office] (3,000,000 yen/Partially damaged) [Nakamachi bus waiting room] (6,000,000 yen/Completely destroyed)
Communications facilities 9,366,000 yen	[Community television reception facilities] (9,366,000 yen/Nakanohama, Hitachihama, Sokei, Tsugaruishi, Shirahama, Kawashiro)
Social welfare facilities 1,745,167,000 yen	[Municipal Nursery] (85,161,000 yen/Tsugaruishi, Taro, Chikei/Completely destroyed, Niisato/Equipment damaged) [Municipal Children's Hall] (3,842,000 yen/Takahama/Inundated above floor level, Taro/Land damaged) [Private nurseries] (10,346,000 yen/Miyako Nursery/Partially destroyed, Sokei Nursery/Inundated above floor level) [Children's parks] (3 places) [Children's pleasure garden] (1 place) [Elderly welfare center etc.] (95,213,000 yen/Sokei Elderly Welfare Center, nursing care prevention base facilities in the Ishihama neighborhood/Completely destroyed) [Thalassotherapy facilities] (1,403,000,000 yen/Partially destroyed) [Taro Senior Citizen Community Center] (245,000 yen/Inundated above floor level) [Private daycare facilities etc.] (147,360,000 yen/10 places/Completely destroyed etc.)
Social education facilities 523,705,000 yen	[Self-Governing Bodies' Training Center] (110,400,000 yen/Taro, Otobe neighborhood/Completely destroyed) [Public Hall] (319,105,000 yen/Tsugaruishi, Kuwagasaki/Completely destroyed, Sokei, Taro/Partially damaged) [Community Center] (94,200,000 yen/Takahama, Horinai/Completely destroyed, Uiso/Partially destroyed)
Cultural facilities 1,115,000,000 yen	[Civic Culture Hall] (1,115,000,000 yen/Partially destroyed, structures damaged)
Athletic facilities 655,467,000 yen	[Fujinokawa Beach] (23,000,000 yen/lavatories etc. completely destroyed) [Taro Ball Park] (562,079,000 yen/Completely destroyed) [Taro Gate Ball Court] (20,000,000 yen/Inflow of sediment) [Sentoku Gymnasium] (388,000 yen/Underground drainpipes ruptured) [Landing stage at the Rias Harbor Miyako] (50,000,000 yen/Structures swept away)
Waterworks facilities 341,000,000 yen	[Waterworks facilities] (223,000,000 yen/8 sites/equipment etc. damaged) [Small water supply facilities] (118,000,000 yen/3 sites/equipment etc. damaged)
Medical/Health facilities 1,692,365,000 yen	[Miyako Health Center] (400,000,000 yen/Partially destroyed) [Clinics] (600,000,000 yen/Holiday emergency clinics/Partially destroyed, National Health Insurance Taro Clinic/Completely destroyed) [Private hospitals etc.] (687,365,000 yen/26 facilities/Completely destroyed etc.) [Pollution laboratory] (1,000,000 yen/Inundated above floor level) [Kurota-machi public latrines] (4,000,000 yen/Partially destroyed)
Firefighting and disaster prevention facilities 780,536,000 yen	[Emergency administrative radio system support stations] (142,500,000 yen/57 places/Swept away etc.) [Emergency administrative radio system receiver for each house] (92,350,000 yen/1,847 units/Swept away etc.) [Emergency administrative radio system mobile transceivers] (26,680,000 yen/46 units/Swept away etc.) [Tide level observation device] (17,000,000 yen/3 places/Completely destroyed) [Evacuation guidance signs etc.] (24,800,000 yen/60 places/Completely destroyed) [Handrails on evacuation routes] (2,000,000 yen/5 places 100 m/Damaged) [Fire stations etc.] (348,605,000 yen/7th, 16th, 24th, 26th, 29th, 30th branches/Completely destroyed, 1st, 2nd, 6th, 11th, 28th branches/Partially destroyed, 4th, 5th, 8th, 10th, 20th, 25th branches/Inundated above floor level) [Fire engines etc.] (126,262,000 yen/15 cars/Swept away etc.) [Fire hydrants] (157,000 yen/2 places) [Water tanks for fire prevention] (182,000 yen/1 place)
Tourist facilities 13,600,504,000 yen	[Natural parks] (10,168,000,000 yen/Park facilities: 10 places, Camp: 2 places, Jodogahama Rest House, Shower facilities etc.: 3 places) [Tourist facilities] (3,432,504,000 yen/Seatopia Naado, Shiosato Station, Beef Village Kuzakai, guesthouses etc.: 33 places)
Commerce-, industry- and labor-related facilities 28,107,000,000 yen	[Disaster-affected places of business] (28,003,000,000 yen/Commercial and industrial places of business: 1,154 places) [Miyako Bay Workers' Welfare Center] (104,000,000 yen/Completely destroyed)
Fisheries-related 21,506,426,000 yen	[Fisheries facilities] (11,056,227,000 yen/643 places) [Fishing boats] (4,454,536,000 yen/2,629 boats) [Fishing implements] (1,871,561,000 yen/33 places) [Farming facilities] (1,701,994,000 yen/2,973 places) [Aquatic products] (2,422,108,000 yen/14,252 ton)

Breakdown of Estimated Amount of Damage by the Great East Japan Earthquake and Tsunami by Damage Category

Damage category	Breakdown (Estimated amount of damage/Name of facilities etc./State of damage)
Fishing harbor facilities 15,033,087,000 yen	[Enclosure facilities] (7,980,569,000 yen/46 places) [Mooring facilities] (624,449,000 yen/26 places) [Water area facilities] (356,129,000 yen/13 places) [Transportation facilities] (504,057,000 yen/19 places) [Fishing harbor facilities site] (236,650,000 yen/17 places) [Dikes] (3,419,550,000 yen/5 places) [Fishing community facilities etc.] (294,539,000 yen/7 places) [Fishing ground facilities] (1,617,144,000 yen/2 places)
Agricultural facilities 36,080,000 yen	[Agricultural and fishing village center] (36,080,000 yen/Kanehama, Chikei/Completely destroyed)
Livestock-related 621,000 yen	[Livestock products] (621,000 yen/Raw milk 6,150 kg)
Farmland and agricultural facilities 1,629,325,000 yen	[Paddy fields] (836,133,000 yen/60 ha) [Fields] (66,993,000 yen/15 ha) [Irrigation and drainage canals] (55,939,000 yen/120 places) [Pumps] (18,000,000 yen/6 places) [Farm roads] (39,260,000 yen/120 places) [Coastal protection facilities] (613,000,000 yen/1 place)
Forestry-related 426,920,000 yen	[Forestry conservancy facilities] (16,800,000 yen/4 places) [Tide-water control forests] (217,184,000 yen/2 places) [Forest roads] (105,600,000 yen/59 places) [Mushroom logs] (8,920,000 yen/49,100 pieces) [Mushroom cultivation facilities] (10,800,000 yen/3 places) [Special forest products] (3,066,000 yen/77 kg) [Dryers] (7,800,000 yen/13 units) [Other machinery] (13,600,000 yen) [Forest fire] (23,602,000 yen/37.47 ha) [Washout of forest] (15,540,000 yen/7.04 ha) [Salt damage to forests] (4,008,000 yen/1.37 ha)
Public works facilities 7,738,258,000 yen	[Roads] (4,229,330,000 yen/43 places) [Bridges] (24,182,000 yen/13 places) [Rivers] (270,690,000 yen/22 places) [Sewer facilities] (555,791,000 yen/6 places) [Drainage facilities for fishing communities] (130,867,000 yen/2 places) [Urban parks] (2,527,398,000 yen/6 places)
Public housing etc. 422,393,000 yen	[Public housing] (422,393,000 yen/ Akamae-higashi Housing 9 houses, Omoe Housing 10 houses/ Completely destroyed, Onatsupe Housing 10 houses/Partially destroyed, Kanehama Housing 13 houses/Partially damaged, Anigata Apartment Housing 17 houses/Inundated above floor level)
Schools 210,292,000 yen	[Elementary Schools] (117,074,000 yen/Miyako Elementary School/Equipment damaged, Kuwagasaki Elementary School/Inundated above floor level, Structures damaged, Sokei Elementary School/Partially damaged, Yamaguchi Elementary School/Equipment damaged, Sentoku Elementary School/Partially damaged, Takahama Elementary School/Structures damaged, Akamae Elementary School/Structures damaged, Uiso Elementary School/Partially damaged, structures and equipment damaged etc., Uiso Elementary School Teachers' Housing/Completely destroyed, Chikei Elementary School/Partially damaged, structures and equipment damaged etc., Taro Daiichi Elementary School/Partially damaged) [Junior High Schools] (92,065,000 yen/Daiichi Junior High School/Partially damaged, Omoe Junior High School/Structures damaged, Taro Daiichi Junior High School/Partially damaged, structures and equipment damaged etc.) [School meal centers] (1,153,000 yen/Niisato School Meal Center/Partially damaged, Omoe School Meal Center, Kawai School Meal Center/Equipment damaged)
Cultural properties 12,084,000 yen	[Nationally registered tangible cultural properties] (12,000,000 yen/Inundated above floor level) [Municipally designated tangible cultural properties] (84,000 yen/Destroyed)
Housing 149,605,110,000 yen	[Damage to housing etc.] (149,605,110,000 yen/5,968 houses/Completely destroyed, 1,335 houses/Severely destroyed, 1,174 houses/Partially destroyed, 611 houses/Partially damaged)
[Total estimated amount of damage: 245,660,884,000 yen]	

* Excluding damage to national/prefectural government facilities and that related to railroad, telecommunications, and electric operators

7. Chronology of Earthquakes and Tsunamis in the Miyako Area

<p>● Apr. Jowa 6 (AD 839) With earthquakes occurring frequently in the Mutsu Province, many peasants fled in fear. A request was made to Taga Castle and Isawa Castle to send reinforcement.</p>
<p>● May 26, Jogan 11 (AD 869) A major earthquake in the Mutsu Province. Many people were crushed to death under collapsed houses. At Taga Castle, castle walls were damaged. A tsunami surged into the castle town, drowning over a thousand people.</p>
<p>● Nov. 23, Kyotoku 3 (AD 1454) An earthquake hit the Kanto and Tohoku regions in midnight with a tsunami coming to the Oshu Province to carry away many people.</p>
<p>● Nov. 23, Keicho 13 (AD 1608) A major earthquake in the Sendai Beach. Over 50 people and women died.</p>
<p>● Oct. 28, Keicho 16 (AD 1611) A major earthquake in the Sanriku region with a tsunami rushing into the territories of Sendai, Morioka, Tsugaru, and Matsumae clans. At around 14:00, Kadoma (or Kasama), Kuroda, and Miyako were in uproar because of a major tsunami. When the floods mostly subsided at around 17:00, no houses remained around the seaside streets with many people drowned. Those who lost home were turned adrift. There were three earthquakes, followed by a major tsunami. The floods reached Fusagasawa in Yamada and Suzudo in Orikasa. Unosumai, Otsuchi, and Yokosuka saw 800 people dead with 50 people killed in Funakoshi, 2 in Yamada-ura, and 150 in Tsugaruishi. Many people died in Otsuchi and Tsugaruishi because it was a market day.</p>
<p>● Mar. 12, Enpo 4 (AD 1676) In Nanbu Oura (or Aomori Prefecture), 20 private houses were swept away. There was no damage to people and horses.</p>
<p>● Mar. 12, Enpo 5 (AD 1677) More than 20 earthquakes occurred from 20:00 until dawn. A major tsunami surged into every bay of the Kitahei area, carrying away houses, boats, and salt pans. At Miyako-dori, 55 boats were swept away, 56 houses damaged or carried away, and 16 salt pans damaged.</p>
<p>● Nov. 8, Genroku 12 (AD 1699) A spring tide of the days 8 to 9 carried away houses and the like in some seaside areas. The floods reached Kubota-watari in Tsugaruishi, and came close to the Inari (Shrine) in Norinowaki. Fire broke out in Kuwagasaki-ura, burning down 20 houses and damaging 13. A small amount of rice from the shogunal storage was distributed among 159 people.</p>
<p>● Oct. 4, Hoei 4 (AD 1707) An earthquake in Hachinohe. The neap tide level came close to the Minato Jubunnoichi Cottage. Hoei Earthquake: a massive earthquake off of Enshu Nada to off the coast of Shikoku around 14:00.</p>
<p>● May 2, Kan-en 4 (AD 1751) Around 14:00, the spring tide poured into Otsuchi-dori Street. Tidewater rose close to the floorboard, submerging fields, rice nurseries, and town alleys. As a result, 13 houses in Ureishi, 15 in Ryoishi-ura, 60 in Ando, 20 in Orikasa, and 50 in Osawa-ura were inundated below floor level.</p>
<p>● Dec. 16, Horeki 12 (AD 1762) A major earthquake before night. In Hachinohe, various places were damaged. At Nanshuji Temple, the shrine and the Buddhist sanctum were damaged. On the day of 18th, a tsunami hit Minato Village, leaving behind seven boats destroyed and stranded. In Kuji Taneichi-dori, 13 destroyed boats became stranded. Dikes and bridges were damaged in several places. In Tanabe-dori and Nobeche-dori, many houses collapsed with fatalities. Kuwagasaki sustained greater damage than expected. At Akasaki-ura (or Akamae-ura), a net shed was damaged.</p>
<p>● May 3, Meiwa 9 (AD 1772) A major earthquake at around 12:00. The Morioka Castle had its stone walls slightly damaged while the Hanamaki Castle sustained damage in various locations. In Nagasawa, Miyako-dori, there were people and horses killed. In Haratai Village, Taro Village, Nagasawa Village, Kawai Village, and Hakoishi Village, large rocks crumbled down with fatalities. Despite being a major earthquake, it was not followed by a tsunami. Legend has it that “Ancient people left a message that there is no tsunami when trees and plants are with green leaves.”</p>

<p>● Jan. 7, Kansei 5 (AD 1793) Kansei Off the Southern Coast of Sanriku Earthquake. A major earthquake at around 12:00. Tsunamis surged into the Rikuchu, Rikuzen, and Iwaki Provinces. Areas under the jurisdiction of the Otsuchidori Governor's Office sustained devastating damage with 72 houses swept away, 11 houses damaged or destroyed, 47 boats carried away, and 11 people killed. In Miyako, the tsunami went upstream of the rivers for three or four times as people fled to the mountains. Miyako-machi, Fujiwara, and Sokei sustained no damage as high waves did not hit these areas. Minor earthquakes continued until mid-February. In Miyako and Fujiwara, people built huts in mountains to evacuate. The earthquakes had a hypocenter near the trench far away off the coast of Miyagi Prefecture.</p>
<p>● Oct. 11, Tenpo 8 (AD 1837) In midnight, a tsunami surged into the Kesen District and Motoyoshi District, breaking through <i>Kawatome</i> implements for catching salmon in the Imaizumi River (Rikuzentakata City). The dikes around the Akasaki Salt Farms, Ofunato, gave way, leaving 2,000 bags of salt to be destroyed by the tsunami. It was strange that a tsunami came without a major earthquake.</p>
<p>● Mar. 26, Tenpo 14 (AD 1843) There was a major earthquake at around 6:00. A tsunami rushed to the coast, damaging houses in Akamae. In Shirogane-mura, Hachinohe, the tsunami swept away fish manure, damaged about 14 to 15 huts on the seaside, and carried away small boats and sardine boilers.</p>
<p>○ Oct. 2, Ansei 2 (AD 1855) Ansei Edo Earthquake. A major earthquake in Edo past 21:00 with the death toll being over 7,000.</p>
<p>● Jul. 23, Ansei 3 (AD 1856) There was a strong earthquake at around 12:00, soon followed by a tsunami. The floods submerged the street in front of the Miyako Governor's Office. In Kuwagasaki, areas ranging from the vicinity of Kojima to Okuwagasaki (Hitachihama and Sumohama) were submerged. In the Kuwagasaki-ura, Takahama-ura, Kanehama-ura, and Akamae-ura, 108 houses were damaged.</p>
<p>● Jun. 15, Meiji 29 (AD 1896) Meiji Sanriku Earthquake and Tsunami. At about 19:32, there was ground motion with a seismic intensity of 2 or so in the Sanriku Coast. About 30 minutes later, a raging tsunami came with furious sound, recording a maximum run-up height of 38.2 m in Shirahama, Ryori Village, Iwate Prefecture. The death toll rose to 22,000.</p>
<p>○ Sep. 1, Taisho 12 (AD 1923) The Great Kanto Earthquake. At 11:58, there arose an earthquake with a magnitude of 7.9 with the hypocenter being at the western part of Kanagawa Prefecture. The death toll rose to 105,000 with an estimated number of completely destroyed houses being 110,000. It has become the worst natural disaster in the history of Japan due to firestorms in urban areas. A tsunami was generated in Sagami Bay.</p>
<p>● Mar. 3, Showa 8 (AD 1933) Showa Sanriku Earthquake and Tsunami. At 2:31, there was heavy ground motion with a seismic intensity of 5 at the Sanriku Coast. In 30 minutes to within an hour, areas from Hokkaido to the Sanriku region were hit by tsunamis, leaving 1,408 people killed and 1,263 missing in Iwate Prefecture.</p>
<p>● May 24, Showa 35 (AD 1960) Chilean Earthquake Tsunami. At 4:11 on the day of 23rd, the world's most powerful earthquake with a moment magnitude of 9.5 occurred off the coast of Valdivia, Chile, in South America. In midnight next day or 23 hours later, the resulting tsunami hit Japan, leaving 142 people killed or missing in six prefectures of Hokkaido to Chiba and Okinawa Prefecture.</p>
<p>● May 16, Showa 43 (AD 1968) Off the Coast of Tokachi Earthquake. At 9:49, an earthquake with a magnitude of 7.9 occurred with a hypocenter being off the eastern coast of Aomori Prefecture. Areas from Cape Erimo in Hokkaido to the northern part of Iwate Prefecture sustained damage from ground shaking, while areas from Kushiro to the Pacific coast of Aomori, Iwate, and the northern part of Miyagi Prefecture sustained damage from a tsunami several meters high. Despite a tsunami height of over 5 m in Hachinohe, Noda, Miyako, Otsuchi etc., damage from the tsunami was slight because of the ebb tide and tsunami dikes that had been built.</p>
<p>● Jun. 12, Showa 53 (AD 1978) Off the Coast of Miyagi Prefecture Earthquake. An earthquake with a magnitude of 7.4 with a hypocenter off Kinkasan Island occurred at 17:14. Areas centering on Miyagi Prefecture sustained damage. The earthquake hit the large city of Sendai with a population of over 500,000, revealing a low seismic resistance of the lifelines.</p>

● Jun. 14, Heisei 20 (AD 2008)

Iwate-Miyagi Inland Earthquake. An earthquake occurred near the prefectural boundary of Iwate and Miyagi with a magnitude of 7.2. A seismic intensity of 6-upper was recorded in Oshu City, Iwate Prefecture, and Kurihara City, Miyagi Prefecture. The earthquake left 30 dwellings completely destroyed and 23 people killed or missing with landslides in highlands accounting for most of the damage.

* The month and day of occurrences that took place prior to the Meiji period are according to the Japanese calendar (lunar calendar), those of events in and after the Meiji period according to the solar calendar.

* Earthquake Research Institute, the University of Tokyo, ed., Historical Documents on Earthquakes in Japan, New Collection, is used as source book to compile a list of earthquakes and tsunamis for which damage to the Sanriku Coast was recorded (marked by ●). In addition, earthquakes and tsunamis that did not greatly affect the Sanriku region but are of historical importance are included in the list centering on those that hit the eastern part of Japan (marked by ○).

* For overview of earthquakes and tsunamis, Dictionary of Historical Disasters in Japan and Learning from the History of Disasters have been mainly used as reference.

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