

**ECONOMIC COMMISSION FOR EUROPE**

**INLAND TRANSPORT COMMITTEE**

**Working Party on Inland Water Transport**

# **Inventory of Most Important Bottlenecks and Missing Links in the E Waterway Network**

**Resolution No. 49**

**Revision 2**



**UNITED NATIONS**  
**New York and Geneva, 2017**

## **Amendments to the Annex to Resolution No. 49 on the Inventory of Most Important Bottlenecks and Missing Links in the E Waterway Network, revised**

### **Resolution No. 87**

(adopted by the Working Party on Inland Water Transport on 6 October 2017)

*The Working Party on Inland Water Transport,*

*Duly taking into account* the strategic objective set up by the Pan-European Conference on Inland Water Transport (Bucharest, 13-14 September 2006) to accelerate the development of inland waterway transport and to better integrate it into multimodal transport chains by ensuring, in particular, its reliability through harmonized fairway depths for interlinked waterway networks and respecting the need for environmental protection in the development of inland waterways (ECE/TRANS/SC.3/2006/11),

*Responding* to the Policy Recommendation No. 1 of the UNECE White Paper on Efficient and Sustainable Inland Water Transport in Europe to make full use of pan-European mechanisms to coordinate the development of the E waterway network (TRANS/SC.3/138),

*Recalling* the updated texts of the European Agreement on Main Inland Waterways of International Importance (AGN) and the Protocol on Combined Transport on Inland Waterways to the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC),

*Considering* Resolution No. 49 “Inventory of Most Important Bottlenecks and Missing Links in the E Waterway Network”, of 24 October 2002 (TRANS/SC.3/159 and Corr.1), revised by Resolution No. 74 of 12 October 2012 (ECE/TRANS/SC.3/159/Rev.1),

*Taking into account* the third revised edition of the Inventory of Main Standards and Parameters of the E Waterway Network (Blue Book, ECE/TRANS/SC.3/144/Rev.3),

*Bearing in mind* the overall objective to develop an efficient, balanced and flexible transport system which meets the economic, social, environmental and safety requirements of UNECE member Governments,

*Being aware at the same time* of the present unsatisfactory state of the European inland waterway infrastructure due mainly to the somewhat fragmentary nature of the E waterway network and limited reliability of traffic on some of its sections which represents a major obstacle to further development of this mode of transport on the continent,

*Desiring* to give an impetus to improving the network of inland waterways of international importance, in particular, by drawing the attention of Governments and international institutions concerned to its most important bottlenecks and missing links,

*Welcoming* the efforts by the European Union on the eliminating of bottlenecks on the inland waterways included in the core transport corridors of the trans-European transport network (TEN-T) under Regulation (EU) No.1315/2013 of the European Parliament and of the Council of 11 December 2013 and similar initiatives in the UNECE region,

*Bearing in mind* the report of the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation on its fifty-first session (ECE/TRANS/SC.3/WP.3/102, para. 19),

1. *Decides* to replace the text of the annex to Resolution No. 49, revised, with the text contained in the annex to this Resolution;

2. *Invites* Governments to inform the Executive Secretary of the United Nations Economic Commission for Europe of any progress in the elimination of the bottlenecks and completion of missing links relating to their respective inland waterways;

3. *Requests* the Executive Secretary to place this Resolution periodically on the agenda of the Working Party on Inland Water Transport with a view to monitoring the progress in the elimination of the bottlenecks and completion of missing links in the E waterway network and revising the Inventory whenever necessary.

## Annex

### Inventory of Most Important Bottlenecks and Missing Links in the E Waterway Network

#### I. Introduction

The European Agreement on Main Inland Waterways of International Importance (AGN) in its annex I establishes the network of E waterways including a few portions that do not presently exist and are considered as missing links. In its annex III, the Agreement stipulates the requirements for the classification of E waterways. In total, 29,238 km of European inland waterways have been earmarked by Governments as E waterways. The above length excludes the double counting of sections on which two or more E waterways overlap (1,504 km).

The breakdown by classes of European inland waterways of international importance is summarized in the table below.

#### Structure of E waterways

	<i>Missing links</i>	<i>Less than class IV</i>	<i>Class IV</i>	<i>Class Va</i>	<i>Class Vb</i>	<i>Class VIa</i>	<i>Class VIb</i>	<i>Class VIc</i>	<i>Class VII</i>	<i>Total</i>
<i>Length (km)</i>	1 988	2 968	4 775	4 646	4 566	630	3 578	4 341	1 746	29 238
<i>Per cent</i>	6.8	10.2	16.3	15.9	15.6	2.2	12.2	14.8	6.0	100

In accordance with the AGN Agreement, only waterways meeting the basic minimum requirements of class IV (minimum dimensions of vessels: 80.00 m x 9.50 m) can be considered as E waterways. The Agreement recommends that the new E waterways to be built (for the completion of missing links) should meet, at least, the requirements of class Vb, while the waterways to be modernized should meet the requirements of at least class Va.

#### II. Definition of bottlenecks and missing links in the network of main inland waterways of international importance

In the course of its work on the draft AGN the Working Party on Inland Water Transport endorsed the following definitions of “bottlenecks” and “missing links” in the inland navigation network, elaborated by the ad hoc Group of Experts on Inland Waterway Infrastructure:

“Those sections of the European waterway network of international importance that have parameter values being substantially lower than target requirements are called bottlenecks.

There are two kinds of bottlenecks:

“**Basic bottlenecks**” are the sections of E waterways whose parameters, at the present time, are not in conformity with the requirements applicable to inland waterways of

international importance in accordance with the new classification of European inland waterways (class IV).

“**Strategic bottlenecks**” are other sections satisfying the basic requirements of the class IV but which, nevertheless, ought to be modernized in order to improve the structure of the network or to increase the economic capacity of inland navigation traffic.

“**Missing links**” are such parts of the future network of inland waterways of international importance which do not exist at present.

The basic condition for the elimination of bottlenecks and completion of missing links is the positive result of economic evaluation.” (TRANS/SC.3/133, para. 18 and TRANS/SC.3/WP.3/AC.1/4, para. 18).

### III. Most important bottlenecks and missing links in the E waterway network by country

#### Austria

##### *Missing links:*

Danube — Oder — Elbe Connection (E 20).

##### *Strategic bottlenecks:*

Danube (E 80) from 2,037.0 to 2,005.0 km and from 1,921.0 to 1,873.0 km — low fairway depth (in some locations down to 2.20 m).

#### Belarus

##### *Strategic bottlenecks:*

1. Mukhovets (E 40) from Brest to Kobrin — low maximum draught (1.70 m).
2. Dneprovsko-Bugskiy Canal (E 40) from Kobrin to Pererub — low maximum draught (1.70 m); upgrading of locks to class Va is envisaged.<sup>1</sup>
3. Pina (E 40) from Pererub to Pinsk — low maximum draught (1.70 m).
4. Pripyat (E 40) from Stakhovo to Pkhov — low maximum draught (1.40 m).
5. Pripyat (E 40) from Pkhov to the Belarus/Ukraine border — low maximum draught (1.50 m).

#### Belgium

##### *Missing links:*

1. Meuse — Rhine link.<sup>2</sup>
2. Maldegem — Zeebrugge (E 07).

<sup>1</sup> Upgrading of lock No. 3 Ragodosch was started in 2015, the startup is planned for 2019; upgrading of lock No. 2, Pererub, is planned for 2019-2020; upgrading of lock No. 4 Ovezichi is planned for 2020-2021.

<sup>2</sup> This link is not mentioned in the AGN Agreement, however, the Government of Belgium has suggested including it into the Inventory.

*Basic bottlenecks:*

1. Bocholt — Herentals Canal (E 01-01), Bocholt — Dessel section.
2. Zuid — Willemsvaart (E 01-01), section Bocholt — the Belgium/Netherlands border.
3. Gent — Oostende Canal (E 02), Brugge — Beernem section.
4. Plassendale — Nieuwpoort Canal (E 02-02-01).
5. Charleroi — Bruxelles Canal (E 04), Lembeek — Bruxelles section — upgrading the height under bridges and improvement of the waterway is required. Project is under study.
6. Bossuit — Kortrijk Canal (E 05-01), Zwevegem — Kortrijk section — upgrading from class I to class Va. Project is under study.
7. Dender (E 05-04), Aalst — Dendermonde section — upgrading from class II to class IV. Project is under study.
8. Beneden-Nete (E 05-06) upgrading the height under bridges. Project is under way.

*Strategic bottlenecks:*

1. Condé-Pommeroeul Canal (E 01) — re-opening of a section currently not in service.
2. Nimy-Blaton — Peronnes Canal (E 01) — upgrading from class IV to class Va is envisaged.
3. Canal du Centre (E 01), the Obourg Lock — construction of a new class Va lock is envisaged.
4. Charleroi — Bruxelles Canal (E 01), the Marchienne, Viesvilles and Gosselies Locks — construction of new class Va locks is envisaged.
5. Meuse (E 01) — construction of class VIb locks is envisaged at Ivoz-Ramet and Ampsin-Neuville.
6. Meuse (E 01) from Pont d'Ougrée to Liège — upgrading from class Vb to class VIb is envisaged.
7. Canal de Lanaye (E 01) — construction of a class VIb lock is under way.
8. Lys Mitoyenne — Lys (Menin — Deinze section) and Lys Derivation Canal up to Schipdonk (E 02) — upgrading from class IV to class Vb is envisaged within the Seine – Escaut link project. Project is under way.
9. Roeselare — Leie Canal (E 02-04), Roeselare — Ooigem section — improvement of waterway for class Va. Project is under study.
10. Sea Canal Bruxelles — Schelde (E 04) — improvement of Wintam — Willebroek section. Project is under way.
11. Charleroi — Bruxelles Canal (E 04), Lembeek — Bruxelles section — upgrading the waterway and the locks to class Va. Project is under study.
12. Haut Escaut (E 05) on section Bléharies-Hérinnes — Tournai passage — upgrading to class Va.
13. Boven-Schelde (E 05), Kerkhove — Asper section — renewal of weirs and upgrading the lock capacity to class Vb. Project is under study.

14. Boven-Zeeschelde (E 05) on section Gent circular canal — Baasrode — upgrading from class IV to class Va. Project is under study.

15. Albertkanaal (E 05), Wijnegem passage and section Kanne — Liège — upgrading from class Vb to class VIb is envisaged.

### **Bosnia and Herzegovina**

#### *Basic bottlenecks:*

Sava (E 80-12), from 515.2 to 178.0 km — upgrading from classes III/IV to classes IV/Va.

### **Bulgaria**

#### *Strategic bottlenecks:*

Danube (E 80) from 845.5 to 375.0 km — low fairway depth during dry seasons (below 2.50 m — value recommended by the Danube Commission) at several critical sections, i.e.:

(a) From 845.5 to 610.0 km, with fairway depth limited to 2.10-2.20 m for 10-15 days a year; and

(b) From 610.0 to 375.0 km, with fairway depth limited to 1.80-2.00 m for 20-40 days a year.

### **Croatia**

#### *Missing links:*

Danube — Sava Canal (E 80–10) from Vukovar to Samac.

#### *Basic bottlenecks:*

1. Drava (E 80-08) from 0 km to 14 km — 3 critical sections with inadequate fairway parameters.

2. Sava (E 80-12) section between Sisak and Brčko — upgrading from class III to class IV.

#### *Strategic bottlenecks:*

1. Danube (E 80) from 1,433.1 km to 1,295.5 km — 17 critical sections with inadequate fairway parameters.

2. Sava (E 80-12) section between Brčko and the Serbia/Croatia border — upgrading from class IV to class Va.

### **Czech Republic**

#### *Missing links:*

Danube — Oder — Elbe Connection (E 20 and E 30).

#### *Basic bottlenecks:*

Elbe (E 20) from the State border to Ústí nad Labem — extremely low fairway depth during dry seasons (0.9-2.0 m); in 1997-2004, the draught was less than 1.40 m during 160-262 days a year making the section commercially non-navigable; the construction of two locks is necessary.

*Strategic bottlenecks:*

1. Elbe (E 20) from Mělník to Chvaletice — narrow width of the lock gates (12.00 m); from Chvaletice to Pardubice - the construction of a lock at Přelouč is necessary.
2. Vltava (E 20-06) from Mělník to Praha — low height under bridges (4.50 m) and narrow width of the lock gates (11.00 m).

**Finland**

*Strategic bottlenecks:*

Saimaa Canal (E 60-11) from Vyborg (Russian Federation) to Kuopio/Joensuu — upgrading to class Va is envisaged.

**France**

*Missing links:*

1. Seine — Nord Europe Link (E 05).<sup>3</sup>
2. Saône — Moselle Link (E 10-02)/Saône — Rhine Link (E 10).<sup>4</sup>
3. Seine — Moselle Link (E 80).<sup>5</sup>

*Basic bottlenecks:*

Seine (E 80-04) between Bray-sur-Seine and Nogent — upgrading is envisaged.

*Strategic bottlenecks:*

1. Condé — Pommeroeul Canal (E 01) — increasing the water depth up to 3.50 m is under consideration in the framework of the project on reopening this Canal for navigation.
2. Dunkerque — Escaut link and Escaut (E 01) up to Condé — lifting of bridges up to 5.25 m is completed, lifting up to 7.00 m is envisaged.
3. Deûle and Deûle Canal (E 02) from Quesnoy/Deûle to Lille — upgrading to class Va is under way, increasing the water depth up to 3.50 m is envisaged, from Lille to Bauvin — lifting of bridges up to 5.25 m is completed, lifting up to 7.00 m is envisaged.
4. Lys Mitoyenne (E 02) — increasing the water depth to 4.50 m is considered.
5. Network Nord Pas-de-Calais (E 02 and E 05) — lifting of bridges and upgrading of links with Belgium to class Va. Lifting of bridges up to 5.25 m is being finalized (summer 2012), lifting up to 7.00 m is envisaged.
6. Rhône — Sète Canal (E 10-04) — works on upgrading to class Va are under way.
7. Oise (E 80) from Conflans to Creil — low draught and height under bridges (3.40 m and 5.18 m, respectively) — increasing the water depth up to 4.00 m is under way.

---

<sup>3</sup> The secretariat was informed by the Government of France that the Seine-Schelde connection project had been modified.

<sup>4</sup> The secretariat was informed by the Government of France that the project concerning the Saône — Moselle Link/Saône — Rhine Link has been abandoned.

<sup>5</sup> The secretariat was informed by the Government of France that the project concerning the Seine — Moselle link has been abandoned.



8. Oise (E 80) from Creil to Compiègne — low draught (3.00 m), increasing the water depth up to 4.00 m is considered.

### Germany

#### *Basic bottlenecks:*

1. Mittellandkanal (E 70) — sections which have not yet been modernized are being upgraded to class Vb. The project is under way.
2. Elbe — Havel — Kanal (E 70) — upgrading from class IV to class Vb is under way.
3. Untere Havel — Wasserstraße (E 70) from Plauen to Spree — upgrading from class IV to class Vb is under way.
4. Berlin region waterways (connection to Westhafen Berlin) — upgrading to classes IV and Vb under way.
5. Havel — Oder — Wasserstraße (E 70) — upgrading from class IV to class Va is under way.

#### *Strategic bottlenecks:*

1. Rhine (E 10) — low fairway depth during dry seasons: from St. Goar to Mainz (1.90 m) and low height under bridges at Kehl/Strasbourg.
2. Rhine — Herne — Kanal (E 10-03) — upgrading to class Vb is under way.
3. Dortmund — Ems — Kanal (E 13) from 108.3 km to 21.5 km — upgrading to class Vb is under way.
4. Weser (E 14) from 360.7 km to Minden — upgrade to Va under way.
5. Weser (E 14) — upgrading of the Minden and Dörverden Locks is under way.
6. Elbe (E 20): middle Elbe from Lauenburg upstream to the Germany/Czech Republic border — low fairway depth during dry seasons (1.20 m).
7. Main (E 80) upstream from Würzburg — low fairway depth (2.50 m); project is under way.
8. Danube (E 80) from Straubing to Vilshofen — low fairway depth (2.00 m at LNWL).<sup>6</sup>
9. Danube (E 80) — low height under bridges at Bogen (2,311.27 km) — 5.00 m; at Passau (2,225.75 km) — 5.15 m; upgrading to 7.00 m is necessary.

*Other bottlenecks, the elimination of which is anticipated to become economically viable only in the framework of a replacement programme supported by a particular investment scheme:*

1. Datteln — Hamm Kanal (E 10-01) — to the east of the Hamm harbour.
2. Neckar (E 10-07) — adaptation of the fairway width and the lock dimensions.
3. Dortmund — Ems Kanal (E 13) to the north of the Mittellandkanal.

---

<sup>6</sup> Low Navigable Water Level; corresponds to a long-term mean water level reached or exceeded on all but 20 ice-free days per year (approximately between 5 per cent and 6 per cent of the ice-free period).

4. Canals branching off from the Mittellandkanal (E 70-02, 70-04 and 70-06) — low fairway depth and height under bridges, insufficient dimensions of locks.

## Hungary

### *Strategic bottlenecks:*

1. Danube (E 80), joint Slovak-Hungarian section from Sap (1,811.0 km) to 1,708.2 km — low maximum draught during dry seasons (1.50 m as registered in the course of years up to November 2011) and at HNWL<sup>7</sup> — low height under bridges:
  - Road bridge Medved'ov (1,806.35 km) — 8.85 m between pillars<sup>8</sup> II-III and 9.19 m between pillars I-II;
  - Railway bridge Komárno (1,770.4 km) — 8.65 m between pillars IV – V and 8.68 m between pillars III-IV;
  - Road bridge Komárno (1,767.8 km) — 9.08 m at centre point of the arches between pillars II-III and III-IV, respectively.

Upgrading of the draught to 2.50 m and the height under bridges to 9.10 m is required.

2. Danube (E 80), from 1,708.2 to 1,433.0 km — low maximum draught (1.50 m — as registered in the course of years up to November 2011).
3. Danube (E 80), at HNWL — low height under the road/rail bridge at Dunaföldvár (1,560.55 km) — 8.73 m between pillars II-III and III-IV, respectively. Upgrading to 9.10 m is required.
4. Danube (E 80), at HNWL — low height under the road/rail bridge at Baja (1,480.22 km) — 8.09 m between pillars III-IV and 8.40 m between pillars II-III. Upgrading to 9.10 m is required.
5. Danube (E 80), from 1,811.00 to 1,433.00 km — the draught of 2.5 m is assured during 180-260 days a year depending on the water level. The project aimed at the elimination of bottlenecks is under way.

## Italy

### *Missing links:*

1. Milano — Po Canal (E 91) from Milano to Pizzighettone.
2. Padova — Venezia Canal (E 91-05) from Romea Dock to Padova.

### *Basic bottlenecks*

Piacenza — Casale Monferrato (E 91-02) — upgrading from class III to class IV is envisaged.

### *Strategic bottlenecks:*

1. Veneta Lateral Waterway (E 91) from Marghera to Porto Nogaro — upgrading from class IV to class Va is envisaged.

<sup>7</sup> High Navigable Water Level; corresponds to a level existing for not less than 1 per cent of the navigation period, established on the basis of observations over a substantial number of years (30 to 40 years), excluding periods when there was ice.

<sup>8</sup> Numbering of pillars of bridges starts from the left bank on the Danube.

2. Mantova-Adriatic Sea Canal (E 91-03) from Ostiglia to the Baricetta lock — adaptation to class Va is envisaged.
3. Ferrara waterway (E 91-04) from Ferrara to Porto Garibaldi — upgrading to class Va is under way.

### **Lithuania**

#### *Basic bottlenecks*

Nemunas (E 41) from Kaunas to Jurbarkas and from Jurbarkas to Klaipeda — insufficient depth of the fairway (1.20 m and 1.50 m, respectively; the depth of 12.5 km fairway stretch in Kaunas is less than 1.20 m).<sup>9</sup>

### **Netherlands**

#### *Strategic bottlenecks:*

1. Maasroute (E 01) — upgrading to class Vb enabling 4-layer container transport is under way.
2. E 03 waterway — increasing the capacity of the Volkerak locks and Terneuzen lock is under study.
3. E 06 waterway — increasing the capacity of the Kreekrak locks.
4. Noordzeekanaal (E 11) — upgrading of the sea locks at IJmuiden to class VIc is being studied.
5. Zaan (E 11-01) — adaptation to class Va with regard to the fairway depth and/or width - height under the bridges and the lock capacity is required.
6. Lekkanaal (E 11-02) — upgrading of the Beatrix lock.
7. IJsselmeer — Meppel (E 12) — insufficient fairway depth and/or width, the project is under study.
8. Upgrading of the Zwartsluis at Meppel — Ramspol (E 12-02) is under way.
9. Upgrading of Lemmer — Delfzijl section (E 15) to class Va enabling 4-layer container transport is under way.
10. IJssel (E 70) from Arnhem to Zutphen — upgrading to class Va is envisaged.
11. Twente Canal (E 70) — upgrading to class Va is under way and an increase of the capacity of the Eefde lock is to be carried out.

### **Poland**

#### *Missing links:*

1. Danube — Oder — Elbe Connection (E 30).
2. Gdansk — Brest Connection (E 40), excluding its existing navigable sections.

---

<sup>9</sup> Nemunas (E 41): insufficient depth of the fairway stretch along 100 km of the Nemunas river stretch near the State border and on the territory of the Russian Federation.

*Basic bottlenecks:*

1. Oder (E 30) from Widuchova to Kozle — upgrading from classes II and III to class Va is required.
2. Glivice Canal (E 30-01) — upgrading from class III to class Va is required.
3. Wisla (E 40) from Biala Gora to Wloclawek and from Plock to Warszawa — upgrading from classes I and II to class Va is required.
4. Zeran Canal (E 40) from Zeran to Zegrze Lake — upgrading from class III to class Va is required.
5. Bug (E 40) from Zegrze Lake to Brest — upgrading to class Va is required. The depth is limited to 0.80 m for 210 days a year.
6. Warta — Notec — Bydgoski Canal (E 70) from Kostrzyn to Bydgoszcz — upgrading from class II to class Va is required.
7. Wisla (E 70) from Bydgoszcz to Biala Gora — upgrading from class II to class Va is required.
8. Szarpawa (E 70) from Gdanska Glova to Elblag — upgrading from class III to class Va is required.

*Strategic bottlenecks*

Oder (E 30) from Szczecin to Widuchova — upgrading from class IV to class Vb is expected.

**Republic of Moldova**

*Basic bottlenecks:*

1. Prut (E 80-07) from the mouth to Branest — upgrading from class II to class Va is required.
2. Nistru (E 90-03) from the Ukraine/Moldova border to Bender — upgrading from class III to class Va is required.

**Romania**

*Missing links:*

1. Olt (E 80-03) up to Slatina.
2. Danube – Bucuresti Canal (E 80-05).

*Basic bottlenecks:*

1. Bega Canal (E 80-01-02) up to Timisoara.
2. Prut (E 80-07) from the mouth to Ungheni.

*Strategic bottlenecks:*

1. Danube (E 80) from 845.5 to 175.0 km — low fairway depth during dry seasons (below 2.50 m — value recommended by the Danube Commission) at several critical sections, i.e.:
  - From 845.5 to 610.0 km, with fairway depth limited to 1.90-2.50 m for 12-46 days a year;

- From 610.0 to 375.0 km, with fairway depth limited to 1.60-2.00 m for 20-40 days a year;
  - From 375.0 to 300.0 km, with fairway depth limited to 1.40-2.50 m for 61-126 days a year<sup>10</sup>; the navigation on the section 346.0 km-240.0 km is diverted via Bala — Borcea branch when the depths in Cernavodă are 1.50 m with decreasing tendency;
  - From 300 to 175 km, with fairway depth limited to 2.00-2.50 m for 5-32 days a year.
2. Danube (E 80) from 170.0 km to the Black Sea — low fairway depth during dry seasons (below 7.30 m — value recommended by the Danube Commission) at several critical points, i.e. at 73, 57, 47, 41 and 37 nautical miles and at the Sulina bar at the mouth of the Sulina Canal where it meets the Black Sea, where the fairway depth is limited to 7.01 m for 2-16 days a year.

### Russian Federation

#### *Strategic bottlenecks:*

1. Volga (E 50) — low water depth from the Gorkovsky hydroelectric complex to Nizhni Novgorod.<sup>11</sup>
2. Volgo-Baltijskiy waterway (E 50) — the Nijne-Svirsky hydro-electrical complex.
3. Don (E 90) from Kalach to Aksay — insufficient depth downstream of the Kochetovsky lock (of 116.3 km long).<sup>12</sup>

### Serbia

#### *Basic bottlenecks:*

Begej (E 80-01-02) from its mouth to the Serbia/Romania border — upgrading from class III to at least class Va is required.

#### *Strategic bottlenecks:*

1. Danube (E 80) from 1,405.6 to 1,227.9 km — narrow fairway conditions.
2. Danube (E 80) — low height under the railway bridge at Bogojevo (1,366.5 km) — 8.15 m — upgrading to 9.10 m is required.
3. Danube (E 80) at Novi Sad (1,254.25 km) — low height under a temporary road/railway bridge (6.82 m).
4. Danube (E 80) from 863.0 to 845.5 km — low fairway depth during dry seasons (below 2.50 m – value recommended by the Danube Commission) with fairway depth limited to 2.20-2.30 m for 7-15 days a year.
5. Tisza (E 80-01) — upgrading from class IV to class Va is under study.

<sup>10</sup> Notice No. 3/08.06.1992 issued by the Romanian River Administration (AFDJ).

<sup>11</sup> Due to the fact that the Tcheboksary Reservoir is not filled up to the project level and that the water level of the Volga River at Nizhny Novgorod — Gorodets section went down, the depth of 3.50 m at the sill of the Gorodetsky lock is only ensured for 2-3 hours a day. To eliminate the insufficient draught, design works were started in 2014 to build a low-head hydraulic complex in the area of Bolshoye Kozino, the startup is planned for 2021.

<sup>12</sup> To eliminate the insufficient draught downstream the Kochetovsky hydraulic complex, the construction of a low-head hydraulic complex near the village of Arpachin is foreseen; the startup is planned for 2021.

6. Sava (E 80-12) from its mouth to the State border — upgrading to at least class Va is required.

### **Slovakia**

#### *Missing links:*

1. Danube — Oder — Elbe Connection (E 20 and E 30).
2. Váh — Oder Link (E 81).

#### *Strategic bottlenecks:*

1. Danube (E 80) from Devín (1,880.26 km) to Bratislava (1,867.0 km) — insufficient depth at LNWL and insufficient height under bridges at the locks of Gabčíkovo Hydro Electrical Complex (1,819.3 km) — 8.90 m. Upgrading is required to 9.10 m.
2. Danube (E 80) from Sap (1,811.0 km) to the mouth of the Ipel' River (1,708.2 km) — insufficient depth at LNWL and insufficient height under the bridges.
3. Váh (E 81), from Komárno (0.0 km) to Žilina (240.0 km) — insufficient fairway depth. Canalization of the river and its upgrading to class VIa (Komarno — Hlohovec) and class Va (Hlohovec — Žilina) in conjunction with the construction of new locks and the reconstruction of the existing locks are required.

### **Ukraine**

#### *Basic bottlenecks:*

1. Pripjat (E 40) from the Belarus/Ukraine border to the mouth — upgrading from class III to class IV is required.
  2. Desna (E 40-01) from the mouth to Chernihiv — upgrading from class III to class IV is required.
  3. Danube, the Kiliiske Mouth (E 80-09) — upgrading the fairway depth and/or width.
  4. Dnister (E 90-03) from Bilhorod-Dnistrovskyi to the Ukraine/Moldova border — upgrading from class III to class Va is required.
-